

T
56
1
1

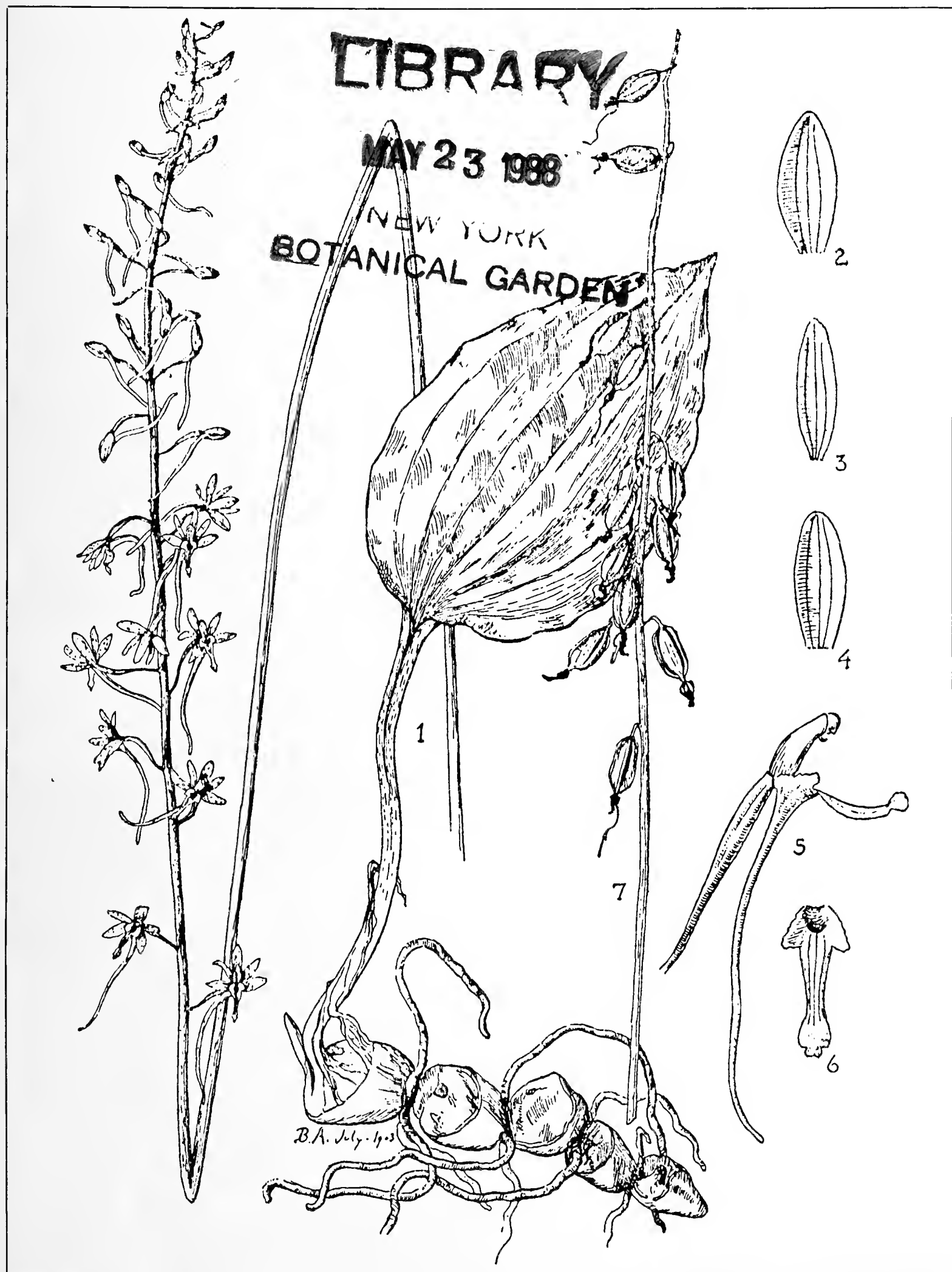
66

Tipularia

A BOTANICAL MAGAZINE

Published by the Georgia Botanical Society

November 1986



Blanche Ames

Tipularia discolor (Pursh) Nuttall

IN THIS
ISSUE

Lost in the wild / 9
An uncommon life / 16

What's for breakfast? / 25
On Greear's ponds / 2

The ecology of sag ponds

Surprise on Cassville Mountain

BY PHILIP F-C GREEAR

ILLUSTRATED BY FAITH BIRKHEAD

The sag pond story, as far as I was concerned, began with a taxonomic observation. In the backwoods of Cassville Mountain in Bartow County, Georgia, about 50 miles from the Coastal Plain, *Andropogon glomeratus* (broom sedge) waved a tall, full, bushy head. Closer examination of a few of the ponds disclosed *Lyonia lucida*, *Nyssa biflora*, and hosts of other populations which are commonly inhabitants of the Coastal Plain.

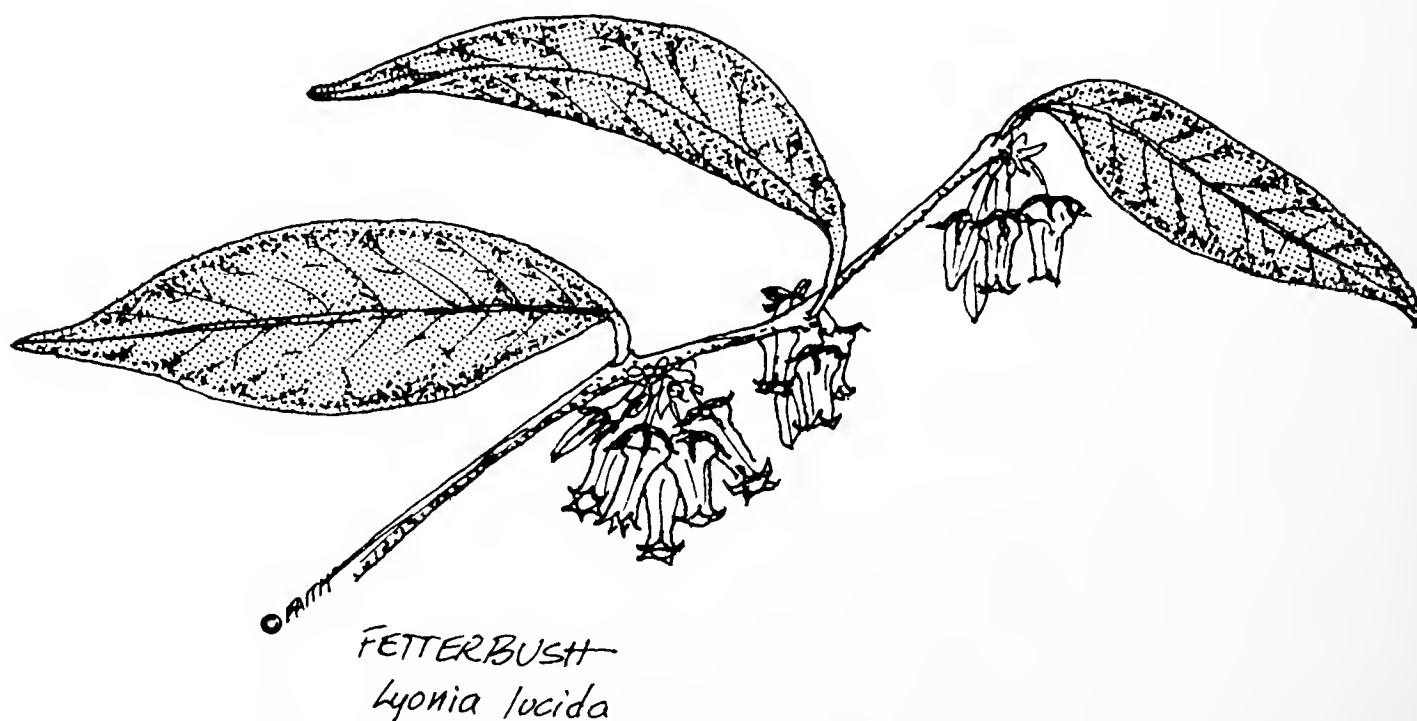
The question "How many others?" led to an effort to find out. To begin with, it was a taxonomic endeavor — and only that. But the more disjunct populations I found, the more pervasive

became the ultimate question: "Why?"

"Why?" is a question which in the 1950s and 1960s was more frequently asked by ecologists than systematists. Asking why led to another sort of investigation which changed not only the direction of the sag pond study, but my own professional direction as well.

I recall camping in a pup tent with my older brothers on Locust Ridge in our natal Grayson County, Virginia, before I was 4 years old. The purpose of the trip was to search for medicinal and seasoning herbs, so taxonomic behavior was an early necessity.

I was raised in the mountains of northeast Georgia in a lumbermill town



which has been stripped recently of its natural charm by commercial alpenization. Our family's idea of an exciting Sunday was to climb Hamby, Hickory Nut, Yonah, Tray Mountain, or Grimes Nose Ridge.

The summer I was 14, I spent two weeks on the 20,000-acre south slope of Tray Mountain wearing a burlap sack and carrying a hunting knife. It would be called survival camping now, but in the 1930s it was merely spending some time in the woods.

I relate this background to explain in part the forces which have directed my professional life.

Taxonomically, the sag pond study was exciting and rewarding. Ultimately I found 24 species of vascular plants previously reported only from the Coastal Plain in North America and 25 other species usually associated with the Coastal Plain which had not been previously found in the Ridge and Valley Province. Six additional species with Northern and Mountain Province affinities were intermingled with those from the Coastal Plain.

As it turned out, these discoveries were made less significant by the emergent understanding of the factors which hold these related, but essentially independent pond systems together.

Within a one-square-mile area of Cassville Mountain, at about 930 feet above sea level, I found 96 natural ponds. I spent one full growing season — early spring to late fall — making weekly collections from the area. Later I narrowed the study to 12 ponds for detailed analysis.

Cassville Mountain is a synclinal structure in the Cambrio-Ordovician Knox group of formations. The bedrock-parent material is dolostone (dolomitic limestone). In the northwest Georgia exposures, it is overlain by an angular chert residuum which is the consequence of natural weathering processes. Reports of drilling done by mineral explorers indicate that this chert layer is approximately 300 feet thick.



BLUE GENTIAN
Gentiana catesbaei

Characteristically, the chert residuum is very permeable to percolating water and is structurally unstable. When highway cuts through such material are poorly designed, landslides often result.

A succession of events creates a depression and ultimately a mature or extinct pond.

First, water percolates down through the permeable chert and, finding a joint or small fissure in the easily weathered dolostone, gradually develops a solution chamber. (Acid dissolution tests under laboratory conditions yield a 97 percent reduction in volume from dolostone to chert residuum.)

Concurrent with development of the solution chamber, the thick overlying chert layers "sag" into the chamber, creating a depression in the surface. As the depression becomes more extensive, the process accelerates because more water can be collected by the surface depression.

However, other forces are at work simultaneously. With time, the depression begins to accumulate a lining of clay and silt with some organic material

which appears to be unique to the sag ponds occurring in the northwest Georgia Knox formation. As clay-silt gets thicker, water is less readily percolated through and the depression becomes a true pond.

When the layer of deposited material in a depression is very thin, it holds water only briefly, but it becomes a longer-lasting pond as the clay-silt becomes thicker.

I first suspected this phenomenon when I observed that each pond had a perched water table associated with it and that the persistence of retained water varied from pond to pond. The variety of plant associations in individual ponds began to make sense in terms of specific adaptation to hydroperiodic factors.

I elected to employ the term "hydroperiod" because, in depressions where water is retained, plants tend to form essentially monotypic concentric zones around the central lowest pool. The occupants of those zones vary from pond to pond because of varying hydroperiods.

After four years of detailed analysis, I was able to group the ponds into four classes, reflecting the thickness of the clay-silt deposits, the species in the zones of vegetation, and succession toward ecological extinction as a pond. The class types are: Dry Sag, with no clay-silt accumulation; Young Pond, about 1 meter of clay-silt; Mature Pond, 2 to 9 meters of clay-silt; and Extinct Pond, more than 9 meters of clay-silt.

By examining the hydrological regime of sites where they occur, I have assorted some species of plants according to their adaptations to specific hydroperiods.

Quercus phellos (willow oak) occurs in Pond No. 44 (1 meter of clay-silt), growing in soil which is at times saturated. (See map on page 5.) Indeed, trunk bases are in water which may be more than 1.5 meters deep when the basin is full. Since the pond drains

rapidly, however, and the water table recedes below the accumulated silt during much of the growing season, the roots of the tree function in unsaturated soils most of the year.

Q. phellos also appears in more fully developed ponds as a marginal species where essentially similar hydroperiodic conditions prevail. It occurs, for example, on the margins of Little Pelfrey Pond (2 meters). Here the soil is saturated as long as the pond is full to overflowing, but is unsaturated as the pond water level goes down. The willow oak does not grow in the deep basins of this kind of pond, apparently because it cannot survive the extended periods of soil saturation characteristic of older ponds.

Acer rubrum (red maple), *Lyonia lucida* (fetter-bush), and *Sorbus melanocarpa* (black chokeberry) are marginal species in more mature ponds (3 to 9 meters) which remain full to overflowing during much of the active growing season from April to July or August. The fact that these species do not grow below the marginal zone may indicate that their aerial parts cannot survive prolonged inundation.

The roots of *L. lucida*, the fetter-bush, on the other hand, seem to require saturation or near-saturation during part of the growing season, because its zone width is closely related to the slope of the marginal surface on which it grows. In Bob Black Pond (8 meters), where the marginal gradient is steep, the zone is 1 meter wide. In Big Pelfrey Pond, where the increase in elevation above the high water level is very gradual, the zone is 6 meters wide.

The outer limit of *L. lucida* is as clearly marked as the inner side of the zone. This limit appears to be due to the influence of periodic saturation of the soil about the roots. It is possible, too, that germination of the seeds of the species is dependent upon hydroperiod and that the width of its zone is controlled by how long water in optimum quantity is available to the seeds.

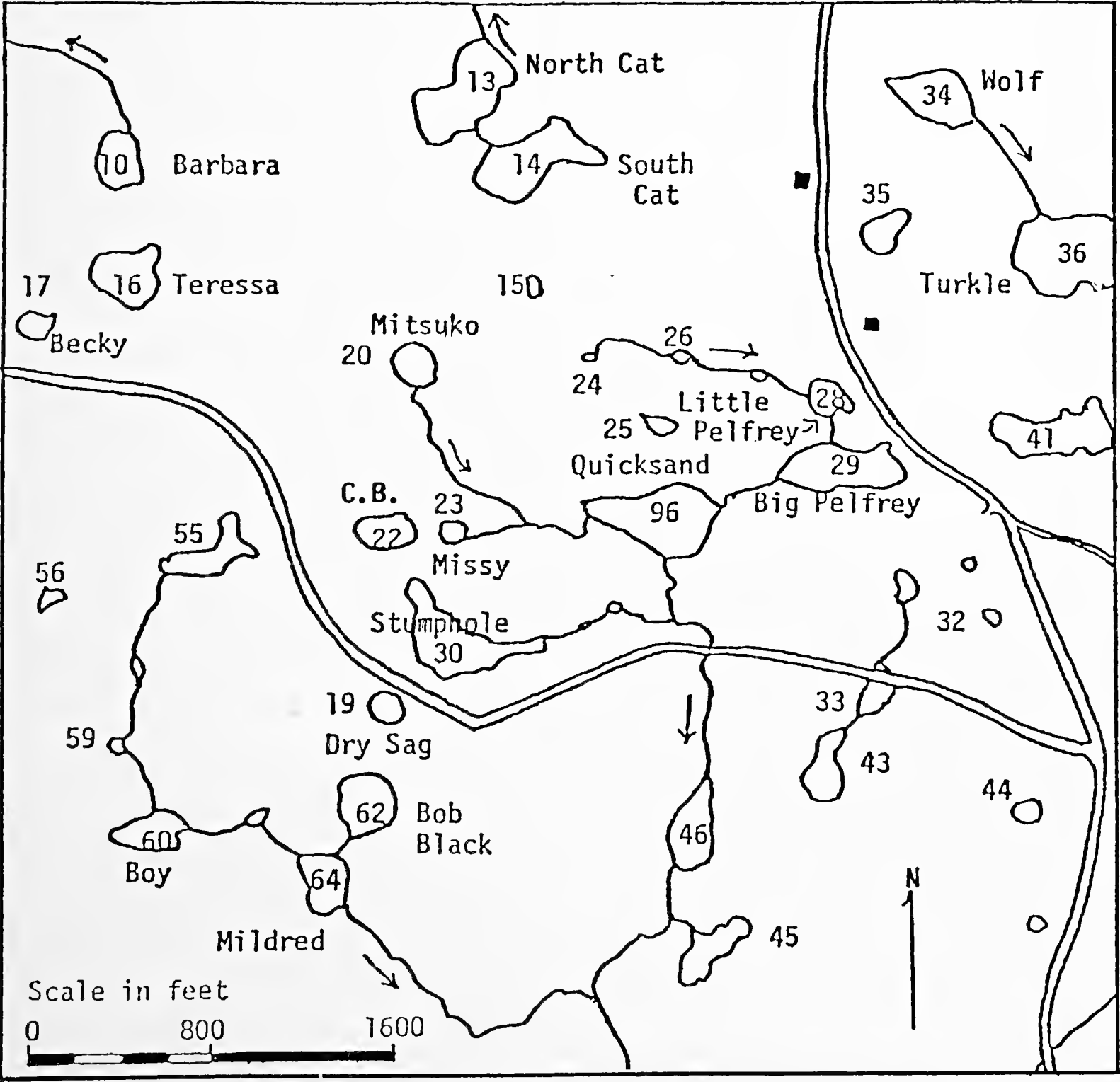
Cephalanthus occidentalis (button bush) and *Nyssa biflora* (swamp tupelo) also occupy key zonal positions in the sag ponds.

The button bush grows in situations where it is limited both by the maximum depth of water in the early part of the growing season and by the minimum level at which the soil is saturated during dry seasons. In Quicksand Pond (9 meters), measurements made in spring indicate that the button bush is limited to areas where the stable water level does not much exceed 1 to 1.5 meters in depth.

Another limit to *C. occidentalis* seems to be set by the maximum depth

to which the water table recedes during dry periods. This factor is suggested by the absence of the button bush from Pond No. 44 and similar immature ponds, where the zone of soil saturation drops below the bottom of the deposit of clay and silt.

Swamp tupelo occurs only in ponds which retain water through a prolonged part of the spring and early summer growing season. In contrast to the button bush, this tupelo seems to require a span of time during which the buttress is inundated. The height and development of these swollen bases are determined by the water depth at the start of the growing season.



Map shows relative location of sag ponds on Cassville Mountain in Bartow County, Georgia, as referred to by author Greear.

Zonation of tupelo occurs because it tolerates prolonged water depths of 95 centimeters and appears to be unsuccessful where the growing season water depth is less than 25 to 40 centimeters. In consequence, the tupelo zone is wide — up to 30 meters — in mature ponds such as Quicksand, Barbara, and Teresa which have gradual littoral slope elevations. In Bob Black, Mildred (No. 64), and C. B. Ponds, the slope is more acute and the zone width is correspondingly narrow.

Bidens discoidea (a beggar tick) in the sag ponds is an occupant of swamp tupelo buttresses, but it occurs only on trees in ponds that rarely or never go dry.

Zonation is apparent in some other aquatic herbaceous species, and the zones appear to be limited by hydroperiodic factors. Among them are *Proserpinaca palustris* (mermaid weed), *Potamogeton pulcher* (pond weed), and *Utricularia biflora* (bladderwort).

Mermaid weed, a shallow-water semiaquatic, initiates growth under water and emerges 10 to 15 centimeters to flower and produce seed. It forms a zone in Mildred Pond just below the marginal zone where the annual fluctuation is less than 60 centimeters. Pond weed occurs in Quicksand and Big Pelfrey Ponds at depths which appear, at times, too deep for the button bush and swamp tupelo. Bladderwort was collected only from relatively mature ponds. It seems limited to ponds with annual water fluctuations of less than 50 centimeters.

In Pond No. 44 (1 meter), *Panicum virgatum* var. *cubense*, a panic grass, and *Erianthus strictus*, a plume grass, grow in distinct zones. Of the two species, the plume grass dominates the lower zone, indicating that it requires saturated soil for a longer period than the panic grass.

The panic grass forms a pure stand in the upper and, in this case, marginal zone. Its success here suggests that while its tolerance for saturated soil is similar

to that of the plume grass, it can survive in soil in which water is available for a shorter period.

E. strictus and *P. virgatum* var. *cubense* were collected in the herbaceous zones of more mature ponds such as C. B. and Teresa, but in each case they grew above or outside the marginal zone where periodic flooding and relatively rapid drainage occur.

Lycopus rubellus (water horehound) is a submarginal perennial which arises from rhizomes in the late summer after the water recedes below the marginal zone. It appears to require inundation during the dormant period and to develop aerial vegetation only after the soil is at least partly saturated.

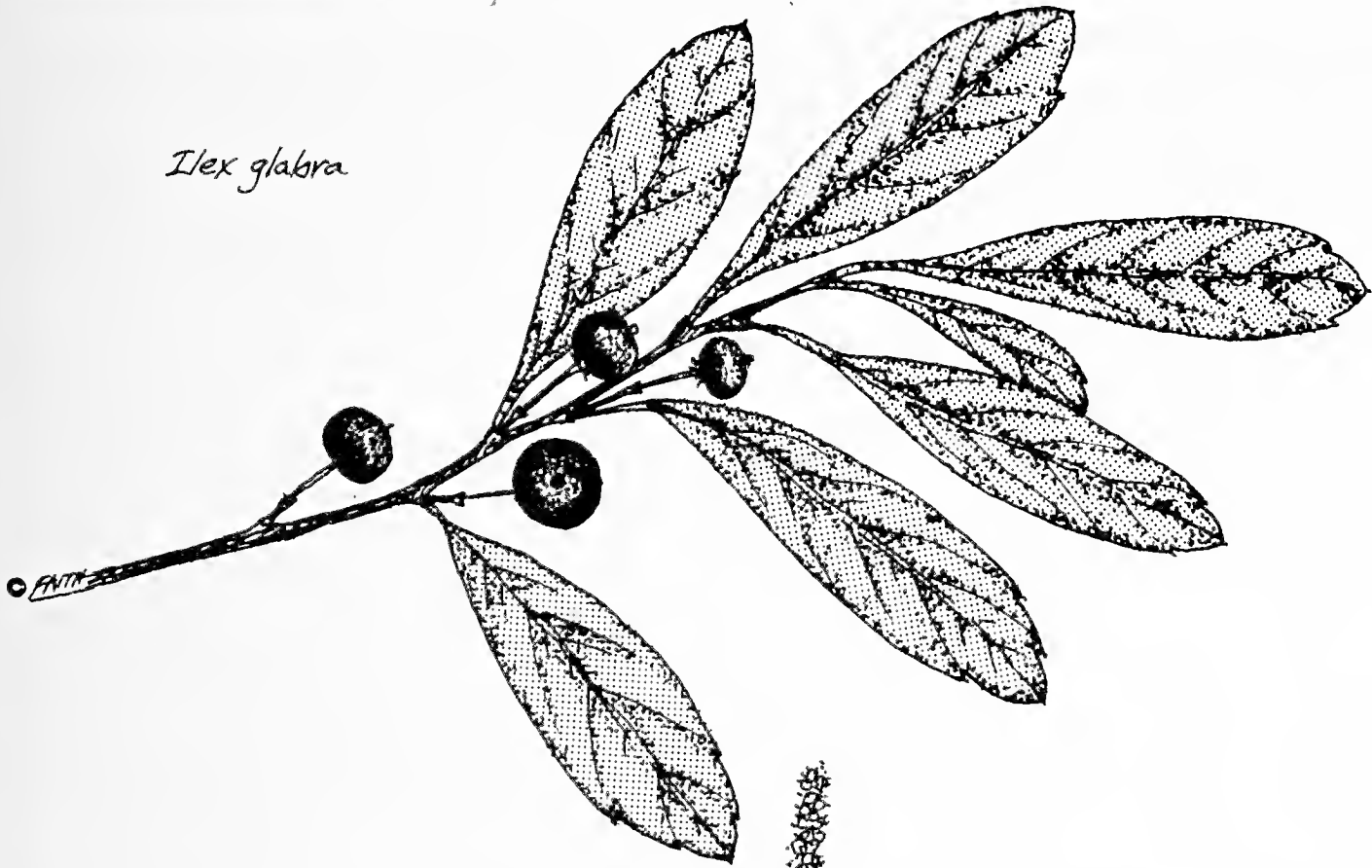
Outside the marginal zones, herbaceous vegetation appears almost universally. The herbs grow on clay-silt which has filled to the marginal level and slightly above. These herbaceous zones are subject to periodic flooding similar to that in marginal zones. In general the herbaceous zones are a few centimeters higher in elevation than the marginal zones.

Frequent prominent occupants of the herbaceous zones are *Manisuris rugosa*, a joint grass; *Rhynchospora inexpansa*, a sedge; *Uniola laxa*, tufted spike grass; and *Panicum trifolium*, a panic grass. In the broad herbaceous zone of Big Pelfrey Pond, *U. laxa* was most numerous near the marginal zone, while at a slightly higher elevation 8 meters away *Panicum spretum*, another of the panic grasses, occurred in greater number.

When ponds become more mature — that is, when they contain deposits of silt and clay thick enough that they tend to retain a perched water level above the surrounding water table — the extent of the annual water level fluctuations is reduced. The consequent change in hydroperiodic influence results in some change in vegetation.

In Quicksand, Barbara, and Teresa Ponds, for example, *Smilax laurifolia* (greenbrier) is a marginal occupant. It

Ilex glabra



POTAMOGETON PULCHER



Cephalanthus occidentalis



does not occur in ponds with annual water fluctuations of more than 60 centimeters. *Gentiana catesbaei* (blue gentian) and *Dulichium arundinaceum* (three-way sedge) seem to be limited to similar hydroperiods.

In Teresa Pond, *Ilex glabra* (gallberry) seems to be the marginal shrub which replaces the fetter-bush, the latter being very scarce. Teresa's annual water level fluctuation is 26 centimeters, least of all the ponds studied.

Cassville Mountain sag pond vegetation

In terms of regional and physiographic affinities, the vegetation of the Cassville Mountain sag ponds can be assorted into three basic categories: (a) taxa previously known to occur in the province; (b) taxa related to the vegetation of Northern or Mountain Provinces; (c) taxa related to the vegetation of the Coastal Plain Province.

Regional vegetation is well-known and will be given no further treatment here. The following lists comprise those populations which are related to populations in Northern and Coastal Plain Provinces.

Species having northern affinities

These six species reach their southern extremity in the vicinity of the ponds:

Aristida curtissii
Glyceria pallida
Carex buxbaumii
Carex gracillima
Juncus subcaudatus
Sorbus melanocarpa

Taxa previously reported in Georgia only from the Coastal Plain:

Manisuris rugosa
Panicum cryptanthum
Panicum scabriusculum
Panicum trifolium
Rhynchospora inexpansa
Rhynchospora torreyana

Carex glaucescens
Carex verrucosa
Xyris fimbriata
Desmodium tenuifolium
Hypericum gymnanthum
Helianthemum rosmarinifolium
Viola lanceolata var. *vittata*
Lyonia lucida
Lycopus rubellus
Agalinis tenella
Oldenlandia boscii
Heterotheca gossypina
Solidago stricta
Solidago tortifolia

Species related to the Coastal Plain

Taxa having affinities with the Coastal Plain which have not been previously reported from the Valley and Ridge Province of Georgia:

Erianthus strictus
Andropogon virginicus var. *glaucopsis*
Panicum ravenelii
Panicum trifolium
Panicum virgatum var. *cubense*
Aristida virgata
Cyperus virens
Eleocharis microcarpa
Rhynchospora chalarocephala
Rhynchospora debilis
Rhynchospora inundata
Carex jorii
Xyris jupicai
Juncus repens
Spiranthes praecox

Drosera brevifolia
Robinia nana
Desmodium lineatum
Polygala nana
Ilex glabra (limited to the Coastal Plain but for one report by Boynton in 1902 near Carrollton, Georgia)
Ludwigia linearis
Hottonia inflata
Styrax americana
Eupatorium linearifolium
Eupatorium semiserratum

Taxa related to the vegetation of the Coastal Plain which are reported infrequently in the Valley and Ridge Province of Georgia:

Andropogon glomeratus
Panicum longifolium
Panicum spretum
Panicum verrucosum
Eleocharis parvula
Eleocharis tuberculosa
Rhynchospora corniculata
Juncus validus
Smilax laurifolia
Iris prismatica
Sisyrinchium arenicola
Quercus laurifolia
Crataegus marshallii
Rubus trivialis
Ludwigia hirtella
Proserpinaca palustris
Nyssa biflora
Cornus foemina
Leucothoe racemosa
Sabatia campanulata
Utricularia biflora
Lobelia appendiculata
Lobelia canbyi

*Despite years of searching and research,
the enigma of *Franklinia alatamaha* endures*

'This very curious tree'

BY JOHN R. BOZEMAN
AND GEORGE A. ROGERS

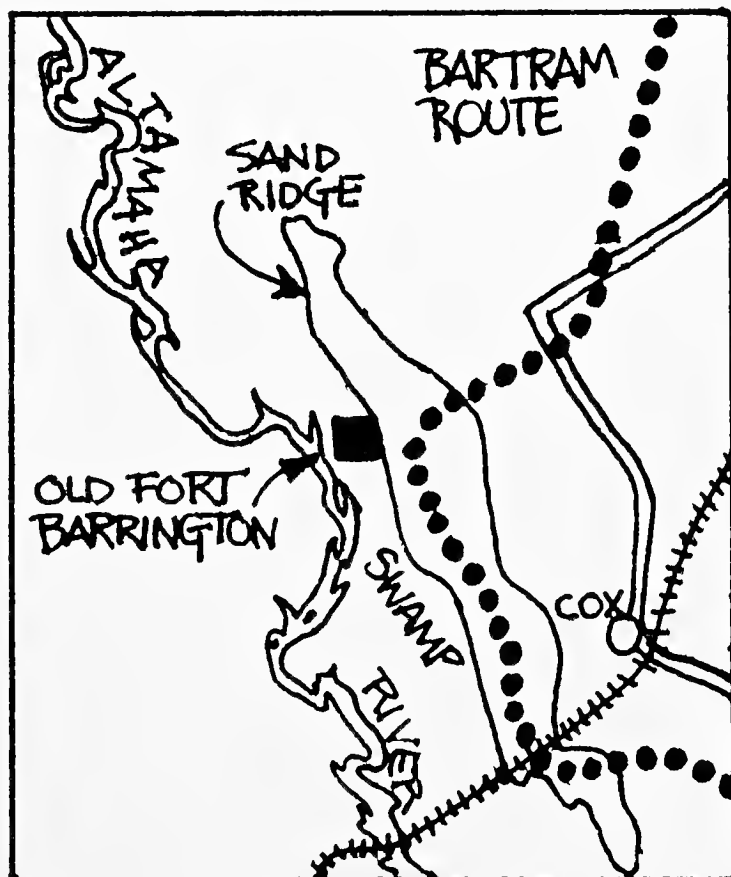
A recent biography of John Bartram, the Philadelphia plant explorer and botanist to King George III, describes the discovery of *Franklinia alatamaha* on the banks of the Altamaha River near Fort Barrington, Georgia. John and his son, William, were traveling south from Savannah. As they approached the fort on October 1, 1765, they missed their way, but their misadventure led them to two new species of small trees, *Pinckneya pubens* and, nearby, the *Franklinia*.

William saw *Franklinia* three times altogether, always at the Altamaha location. "This very curious tree," as he once called it, was not flowering the first time or when he returned in late April 1773. But he saw it "in perfect bloom" in the summer of 1776. It was named to honor Benjamin Franklin.

In 1790 Dr. Moses Marshall, a neighbor of the Bartrams, collected plants at the site and Luigi Castiglioni, an Italian visitor, published a description of *Franklinia* with accompanying sketch. The English plant hunter, John Lyon, reported seeing it there in 1803.

In 1881 Charles Sprague Sargent,

director of the Arnold Arboretum at Harvard, requested Henry W. Ravenel of Aiken, South Carolina, to attempt to "rediscover the long lost tree." Ravenel visited the area in March and November of that year, and his son, Harry, in June, July, and September. These searches and two others mentioned by Ravenel were in vain. Both Ravenel and Sargent regarded the tree as lost in the wild. It soon became the "lost *Gordonia*."



PATTY O'KEEFE HUTTON

*Franklinia eludes today's searchers
in area of the Bartram discovery.*

Professor Edgar T. Wherry of the University of Pennsylvania sought it unsuccessfully in the 1920s. C. C. Harold, M.D. and amateur botanist of Macon, Georgia, distributed picture post cards of *Franklinia* to Boy Scouts, foresters, and hunters in hope of a sighting. Francis Harper and Arthur N. Leeds of the Academy of Natural Sciences of Philadelphia were in the Fort Barrington area in the 1930s. They used a map drawn in the 1750s by William Gerard DeBrahm that showed the trails of the time. Partly because they found *Pinckneya* nearby, they chose a site 1.7 miles northwest of the Cox community in McIntosh County as the probable locale of the Bartrams' discovery.

During the 1960s John R. Bozeman discussed *Franklinia* several times with Francis Harper, studied with great care the writings of botanist and geographer Roland M. Harper (1878-1966), and began a series of searches. Bozeman was joined in the 1970s by George A. Rogers in a systematic coverage of the likely habitat area.

As an illustration of our searches, we may describe one on December 29, 1971. Bozeman reasoned that the plant had probably been found when the Bartrams lost their way and traveled some four miles downriver from the fort. Most probably it had been near the route marked "Path to Darien" by DeBrahm. Bozeman, Vivian Rogers, Ernie Campbell, and George Rogers met W. E. "Ted" Young of the Georgia Department of Natural Resources at Darien. Young and William G. Haynes of Darien had arranged permission to go on private properties below Fort Barrington.

We assumed that *Franklinia* had been brought to this area by the Altamaha River and that the series of oxbow lakes abutting the sand ridge were remnants of a former channel of the river. Our purpose was to search the former river bluff as methodically as possible. Young took us to Fishing Lake as a

starting point and we set off upstream with our aerial photographs and cameras.

We returned for lunch and then followed a course downstream, skirting the lakes along the bluff. We reconnoitered several small hammocks within the swamp, sometimes wading in the cold water. We turned back when we came in sight of the railroad.

With only an hour of daylight left, we visited the fort site and on our way back briefly checked a back swamp east-northeast of the road. The water was high and day was fading, so we postponed that area for a later search.

Plants observed that day numbered about 40 woody species, but included neither *Stewartia malacodendron* nor *Franklinia*. *Gordonia lasianthus*, the loblolly bay, a near relative of *Franklinia*, occurred only in the bays and other moist places and never along the river bluff.

On a search several years later of an area not far from the postponed bay we found dried leaves (but no tree) that we hoped were *Franklinia*. After microscopic examination of the leaves, we concluded that we were mistaken.

Although all searches since 1881 have failed, there is evidence that the *Franklinia* site was known, or its existence assumed, in the pre-Civil War period. Botanist William Baldwin, who at one time was stationed at St. Marys as a naval surgeon, wrote as if it existed in 1816; he had probably visited the location with Louis LeConte of the famed Woodmanston Plantation in Liberty County. LeConte's daughter, Ann LeConte Stevens, implied an abundance of *Franklinia* when she suggested in 1854 that it be used as an understock for grafting camellias.

James A. LeConte quoted his cousin, Mrs. E. LeC. Furman, as saying that

William Bartram did this pen-and-ink drawing of Franklinia alataamaha (opposite) around 1788. Courtesy British Museum (Natural History).



Louis LeConte had "made botanical excursions into the Altamaha region" with Baldwin and with "Mr. Gordon, the Scotch collector and botanist." He added his own comment: "I have had the impression for years that Louis LeConte led him to the tree (or shrub) in situ in the swamp."

In his 1849 account of his second American journey Sir Charles Lyell, the English geologist, clearly assumed, on the basis of information supplied by his host, James Hamilton Couper of Hopeton Plantation, that Couper knew the precise location. Charleston botanist-banker Stephen Elliott commented in 1822 that all the trees then in the gardens had their origins in the Fort Barrington site.

Elliott's "collection journal," which covers a period from July 5, 1810, to October 5, 1814, contains detailed Latin descriptions for 273 species of plants. For the vast majority — 265 — a date was entered in the lower right portion and usually a statement on habitat was included.

Elliott described both *Gordonia lasianthus* and *G. pubescens*; the latter we know as *Franklinia alataamaha*. Under habitat for *G. pubescens* he wrote "Fort Barrington: alataamaha" and noted that flowering was in June and July with a question mark after August. The date given was "22. Jun: 1814." He had headings for seeds and seed capsule, but both were blank; this suggests his specimen had neither.

To interpret Elliott's entries for habitat and date, we must reconstruct his collecting procedures. His letters, herbarium, and published writings reveal him as a meticulous student of botany. Habitually, his citation of a precise habitat indicated that his specimen came from that site. Since there was only one known site in the wild, his *Franklinia* came either from the original location or from a cultivated specimen. While the latter is possible, we know that Elliott ranged widely in his collecting expeditions,

once going as far as central Alabama.

In "A Sketch of the Botany of South-Carolina and Georgia" (1821-1824), Elliott commented under *Coreopsis lanceolata*: "I collected around ponds a few miles from Darien, along the road to Fort Barrington." We can date at least one botanizing trip to the Altamaha region late in 1818. Thus, his specific reference to the Fort Barrington area infers strongly that his specimen originated there.

Elliott typically gave credit to others who collected specimens for him. In his collection journal he recorded an unidentified hibiscus as "found by Mr. Oemler in Georgia." (Augustus Gottlieb Oemler was a Savannah druggist with a special interest in botany and horticulture.) Subsequently Elliott published the plant as *Hibiscus carolinianus* with the remark that "this plant was raised in my garden from seeds collected by Mr. Oemler on Wilmington Island, Georgia." Unless Elliott departed from his standard practice, we must conclude that he personally collected his *Franklinia* specimen, probably from its native site.

Although we have no documentation in Elliott's letters or other records that he knew that site, he had ample opportunity to learn it. He and John Lyon were together several times, including four days of botanizing along the Ogeechee River in 1809. Elliott apparently never met William Bartram during visits to Philadelphia in 1808 and 1812, but he did meet the painter Charles Willson Peale and Henry Muhlenberg, the botanist and Lutheran minister from Lancaster, Pennsylvania, and may have gleaned something of Bartram's knowledge from them.

Also, Elliott's relations with William Baldwin were very close, and he was acquainted with Louis LeConte and his brother, zoologist and botanist John Eatton LeConte. Elliott owned or operated plantations in Chatham, Bryan, Liberty, and Camden Counties. It is likely that if any of the planters

Andre Michaux found Pinckneya pubens on the St. Marys River and Pierre-Joseph Redoute drew it from the Michaux specimen. The Bartrams had seen it 25 years earlier in the Altamaha River area when they first came upon Franklinia.



knew the precise location, Elliott also knew.

We should also consider his use of dates in his collection journal. Generally they correspond with known flowering periods. If Elliott wrote his description from fresh specimens, he probably entered the date of collection. If he pressed his specimens before writing the description, normal procedure would be to include collection date and site so the date could be retrieved later.

His *Gaillardia lanceolata* entry pro-

vides an illustration. He wrote that it was found near Mill Haven on March 19 and "flowers in April." The presumption is that he collected the plant shortly before flowering time and recorded the collection date.

In summary, Elliott habitually gave credit to other collectors, even when it was a new species; when a precise site was given, he meant that the specimen came from there; he had opportunities to learn the *Franklinia* location; he is known to have collected in the

Altamaha area; and he recorded a date that is probably the collection date on a majority of his specimens. It thus seems probable that he collected *Franklinia alatomaha* from its native habitat near Fort Barrington on June 22, 1814.

Many persons, beginning with William Bartram, have speculated about the presence of *Franklinia* in only one small area. No other location has ever been found, although there have been reports of a tree or several trees in the wild near Mount Airy, Georgia.

One of the most recent speculations was by Professor Gayther L. Plummer of the University of Georgia. In 1977 he proposed a theory that the *Franklinias* were planted as seeds or transplanted as young seedlings to that one site, probably from an Asiatic origin.

Unfortunately, for his thesis, there is no hard, factual historical evidence to support it. Plummer implied that the importation of *Franklinia* might be mixed in with importation of tea plants or seeds, but rather firm historical evidence puts their first importation into Georgia in 1772 — seven years after the Bartrams found *Franklinia*. It may be worth noting that John Bartram commented on the use of a tea made from *Ilex vomitoria* (yaupon), not *Camellia sinensis*, during his 1765 journey.

One way to demonstrate with nearly complete certainty that *Franklinia alatomaha* is a native species would be to find a second population farther up the Altamaha or elsewhere. Roland Harper suggested that such a search should be made. Meanwhile, the search for surviving remnants of the original population will continue, assisted by our increasing knowledge about its culture and preferred habitat.

An example of the possibilities of discovery is provided by comparison with the Georgia plume, *Elliottia racemosa*. It is also a rare tree endemic to the Coastal Plain of Georgia, with the exception of an extant population in the Piedmont.

Elliottia, named by Muhlenberg for Stephen Elliott, its discoverer of record (William Bartram found it in 1773 and 1775 and painted it twice), was first known to the scientific community from a site in Burke County, Georgia. Later discoveries in the 19th century turned up populations in Richmond and Columbia Counties, Georgia, and possibly near Aiken, South Carolina. Yet by 1900, practically all of these sites had become extirpated and the plant was thought to be near extinction.

Then between 1901 and 1903 Roland Harper found several widely scattered sites between Bulloch (now Candler) County and Telfair and Coffee Counties in the region he described as the Altamaha Grit. Other discoveries followed in the 1930s, 1940s, and 1950s until about a dozen sites were known. Beginning in the 1960s and continuing into the 1980s, Bozeman and Rogers are credited with discovering about 30 sites, many of which number a dozen or more plants on fractions of acres.

Both *Franklinia* and *Elliottia* have strong ties with relatives in southeast Asia. *Franklinia*'s closest relatives are species of the genus *Schima*, while *Elliottia*'s are three species now placed in the genus *Elliottia*, which occur in Japan (formerly *Tripetaleia*) and the North American northwest (*Cladothamnus*).

While success has crowned our efforts to find additional populations of *Elliottia racemosa*, the enigma of *Franklinia* is that the plant was found in nature in only one locale. It was plucked by Bartram from near extinction. No validated reports or collections are known from any other place in the world.

The other new species the Bartrams came upon that October day 221 years ago, *Pinckneya pubens* Michaux, or *P. bracteata* (Bartram) Rafinesque, the Georgia feverbark tree, is still found in the vicinity, and several searchers since 1880 have used its presence as a clue to the location of *Franklinia*. The two

were near each other, but not at exactly the same location.

Since the older of the authors of this paper is 68, his activities must be curtailed, but John Bozeman, joined by Fred Marland, will continue until he, too, must abandon the search for the lost *Franklinia alatamaha*.

Perhaps it will be best not to find it. Then the mystery will persist and the excitement of the search will continue. After Rogers and after Bozeman, there will be younger persons who will be drawn by the unknown. For them it will be good if the hidden treasure remains to be found.

See page 24 for Selected Readings.

The little girl and the whirlybird

BY MARTHA FORT PRINCE

I have two footnotes to the *Franklinia* story.

When I was a child, of perhaps 11 or 12, my mother pointed out some white-flowered trees in the north Georgia woods. She said there was a story about the "lost Franklin tree" that was "poppycock," for these were some of the trees.

I can't pinpoint the place, unfortunately. There was a sort of ravine with a stream, and the trees were on the opposite side from the path on which we stood. This was not one of our usual hiking places (from Mount Airy, in Habersham County), but a place she and her brothers and sisters had discovered long before. We started from a parked car on a dirt road.

I have been studying the U.S. Geological Survey map, and I can only guess that the stream was some small source of the Savannah River lying south of U.S. Highway 23 between Baldwin and Lula, in Banks County. It is just possible that it was a bit further west.

On the map I find that Grove Creek, the westernmost source for the Savannah, is in one place only two miles from Candler Creek, which flows into the Oconee River and then into the Altamaha River. That *Franklinia alatamaha* originated upstream from the Bartram stand is quite plausible. I would dearly love to search by helicopter, at bloom-time.

It is possible, of course, that Mother was wrong. She was, however, a quite good amateur botanist and a trained artist with a careful eye. If the flowers she showed me were not *Franklinia*, what were they? *Stewartia malacodendron*, the silky camellia, blooms two months too early, and *Gordonia lasianthus*, the loblolly bay, is quite obviously evergreen.

My second note is a theory for the disappearance of the Bartram stand. In an article I wrote for *American Horticulturist* in 1977 I suggested that the trees might have been drowned by salt water as well as fresh water in some coastal storm after 1803, the date of the last verified sighting of the stand, by John Lyon.

Since the article appeared, I have gotten dates on several very damaging storms along the Georgia coast. There was a "Great Gale of 1804" (September 12), which came inland from St. Simons. Other severe storms hit in 1810, 1811, and 1813. These four storms could easily have been too much for the *Franklinias*. Perhaps we'll never know.

The crane-fly and the moth

*Or how to make
Tipularia discolor*

BY DAVID L. EMORY

ILLUSTRATED BY
PATTY O'KEEFE HUTTON

After the idea had come to several members of the Georgia Botanical Society that we should start a publication devoted to the study of Georgia botany and botanists, a natural question arose: What should we call it?

Marie Mellinger gets credit for suggesting *Tipularia*. *Tipularia discolor*, the crane-fly orchid, is found throughout Georgia, probably in every county. This writer's impression is that in the upper Piedmont, at least, it is the region's most common orchid.

Tipularia, also known as the crippled crane-fly, the mottled crane-fly, and elfin-spur, is found usually in deciduous forests in the eastern United States from north Florida and east Texas as far north as Massachusetts and southern Michigan. It is localized in the northern part of its range and common only from North Carolina and Tennessee southward.

This orchid was first described as *Limodorum unifolium* in 1813 by Henry Muhlenberg; Frederick Pursh named it *Orchis discolor* in 1814; and Thomas Nuttall transferred it to a new genus in 1818. Thus it became *Tipularia discolor* (Pursh) Nuttall.

The generic name comes from the in-

sect genus *Tipula*, the crane fly, because the delicate flowers resemble those long-legged insects that look like huge mosquitoes.

Many authorities translate the specific epithet *discolor* as "two-colored," referring to the leaf, which is green above and purple below. Others state that the word means "mottled," "of different colors," or "faded," referring to the flower's coloration or to the sometimes-blotched leaf.

Orchids belong to a large, mostly tropical family of highly evolved flowering plants that include both epiphytic and terrestrial forms. *Tipularia* is placed in the largest of three subfamilies, Orchidoideae. This subfamily is characterized by having only one fertile anther, the pollen-producing part.

Three very similar species have been described within the genus *Tipularia*: *T. josephii* of the Himalayas, *T. japonica* in southern Japan, and *T. discolor*. All are terrestrial.

The crane-fly orchid has an underground stem that is modified into a series of food storage organs, or corms, similar to those of the gladiolus. Roots are located between the corms. The plant emerges from the ground at the apex of the newest corm.

In the autumn, a single, two-colored leaf appears. The blade is oval and is about 3 to 4 inches long and 2 to 3 inches wide. It lasts all winter, finally withering in mid-spring. Nothing more is seen of the plant until the flower stalk emerges, as early as June in the northern part of the range and as late as September in Florida. In Georgia, *Tipularia* generally flowers in August.

The flower stalk, a scapose raceme inflorescence, is brown to purple. It may be up to 2 feet tall, but more often is only 12 to 18 inches. The raceme has no leaves and the upper half bears numerous flowers. The flowers vary in color from reddish-purple to yellow, green, or brown and are nearly half an inch long.

Most of the stalk (pedicel) of each flower is an inferior ovary, the part that forms the fruit after pollination. At the apex of the ovary are three sepals and three petals. All are nearly alike except for one modified petal, called the lip, that has an elongated nectar pouch (or spur) behind. The spurred lip is actually the uppermost petal. As in most orchids, however, the ovary becomes twisted 180 degrees and the lip appears to be the bottom petal.

Close examination of the illustration on the cover of this magazine will reveal that the youngest (upper) flowers have their spurs below.

After *Tipularia* is pollinated, the sepals and petals wither. The ovary swells and hangs down beside the stem while ripening into a seed-filled capsule. As in all orchids, the seeds are tiny and numerous.

Orchids are noted for pronounced bilateral symmetry in their flowers: Divide one vertically and the two sides are mirror images of each other. But the crane-fly's flower is nonconformist. One lateral sepal overlaps the dorsal sepal, with a decidedly asymmetrical appearance resulting. This is why many people call it the "crippled crane-fly." Correll states that it is the only orchid in North America with an asymmetrical flower.

A study by Warren Stoutamire goes into the specific way in which this asymmetry is an adaptation to insect pollination. The crane-fly orchid is pollinated by moths of the family Noctuidae, usually called "millers" because they are so completely covered (body, legs, wings) by grayish scales that give them a dusty or floury appearance. The orchid flower's pollinia (waxy packets of pollen) will not adhere to any part of the moth except its compound eyes, which are not covered with scales.

A less conspicuous aspect of the asymmetry is the fact that the column — the central part of the flower containing both the pollen-producing anthers and the pollen-receiving stigma —

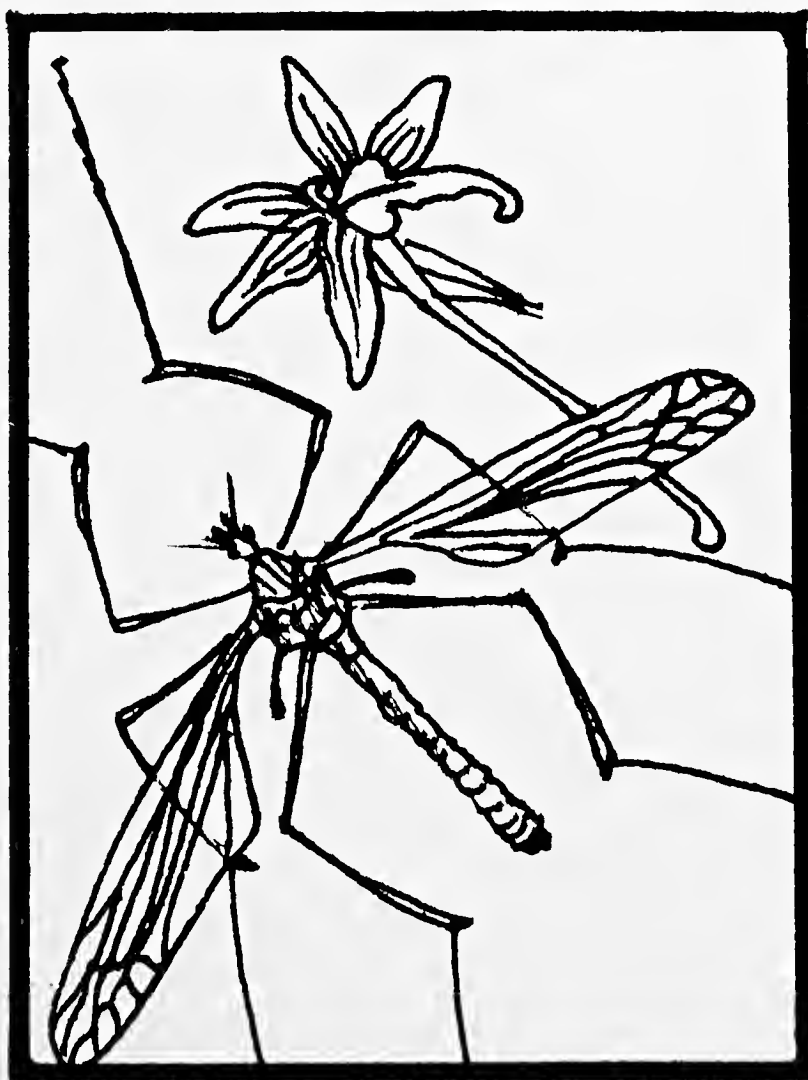
is displaced slightly to the left or right. Thus, upon alighting on the flower and inserting its tongue into the nectary (spur), the moth is forced to bring one of its eyes into contact with the column and a sticky mass of pollen adheres to the eye.

Tipularia discolor has both right-handed (dextral) and left-handed (sinistral) flowers. A moth with pollinia on its right eye can pollinate only another dextral flower or on its left eye only another sinistral flower.

Stoutamire concludes that the two Asiatic species, *T. josephii* and *T. japonica*, probably are more primitive than *T. discolor*. Their flowers appear to have the bilateral symmetry predominant in orchids and presumably are pollinated by insects rather different from the noctuid moths. Our crippled crane-fly orchid is, in Stoutamire's words, "modified in an unusual way" for pollination by the dusty "miller."

What a fascinating plant we have chosen to give its name to our new publication!

See page 24 for Selected Readings.



The crane fly and the crane-fly orchid: Tipula and Tipularia.



‘Being of no use whatever’

Q. Georgiana is mostly a shrubby species of oak from six to eight feet high, but sometimes attains the proportions of a tree thirty feet tall. It is found on Stone Mountain in Georgia and along the rocky banks of the Yellow River. It is, in fact, very local in its habitat. Its small, obovate leaves have a wedge-shaped base and from three to five variously formed lobes with persistent, bristle tips. The acorns with saucer-shaped cups also are small, two usually growing together on short peduncles. As the tree grows in thick clumps it is more of a botanical curiosity than worthy of admiration. Economically it is regarded as being of no use whatever. — **Alice Lounsberry** in “Southern Wild Flowers and Trees,” published in 1901.

Meet the state's seven scarcest oak species

What is so rare as a *Quercus georgiana*?

BY HOWARD A. MILLER*

ILLUSTRATED BY MOZELLE FUNDERBURK

Many violent environmental occurrences have significantly influenced the evolution of the eastern deciduous forest. Man's impact through fire, cutting, and flooding created some ecological changes which were beneficial and others which were not. The forests, however, and their oaks, played a significant role in the early settlement of North America. They abounded in game as a source of food and also provided shelter against storms and violent weather. Settlers drove their herds of cattle, hogs, and sheep into the forests to fatten them on wild vegetation, including oak acorns. Locally sawn oak lumber was used for wagon beds, tools, fence posts, and furniture.

Fifty percent of today's forests east of the 100th Meridian in the United States are deciduous, with a significant oak component. Within these forests, 43 species and varieties of oaks exist. Three of these are usually observed in shrub form, rarely reaching tree size. Others range in size from small trees,

such as Georgia, bluejack, myrtle, and Chapman oaks, to the massive live, northern red, white, cherrybark, and Shumard oaks.

In addition to valuable commercial products, these forests contribute an appealing recreational environment, wildlife habitat, and a display of autumn color equaled only by the sugar maple-conifer forests of New England. It is no wonder that there are more than 100 oaks considered as "famous and historic" in the United States — more than any other tree species. — *Howard A. Miller* in the preface of "Oaks of North America."

Oaks abound in Georgia. The state has 27 of the 43 species and varieties that "Oaks of North America" lists east of the 100th Meridian — a line slicing about midway through the Dakotas, Kansas, and Texas and lopping off the Oklahoma panhandle to divide the United States into two roughly equal parts.

"Atlas of the Vascular Flora of Georgia," published in 1984 by the Georgia Botanical Society, shows that eight species grow in all of the state's 159 counties. They are: White oak, *Quercus alba* Linnaeus; post oak, *Q.*

*Condensed from "Oaks of North America" by Howard A. Miller and Samuel H. Lamb, Naturegraph Publishers, 1985. Copyright by Miller and Lamb. Used by permission.

stellata Wangenheim; overcup oak, *Q. lyrata* Walter; cow (swamp chestnut) oak, *Q. michauxii* Nuttall; red oak, *Q. rubra* Linnaeus; swamp red oak, *Q. shumardii* Buckley; black oak, *Q. velutina* Lamarck; and blackjack oak, *Q. marilandica* Muenchhausen.

No species in the state is more famous, however, than the live oak, *Q. virginiana* Miller. America's most durable warship, the frigate Constitution, "Old Ironsides," launched in 1787, had ribs and hull parts of Georgia live oak. More of it was used in 1927 when the ship was overhauled, and early in 1986 Constitution crewmen scouted areas near St. Marys, Georgia, for still more live oak for a new round of repairs.

As it happens, the state's namesake oak, *Q. georgiana*, is one of the rarest in Georgia. It was named by Moses Ashley Curtis (1808-1872) for the state in which it was first described. Curtis, a Massachusetts-born minister sent as a missionary to North Carolina in 1835, botanized while enjoying poor health. He became an expert on lichens and fungi and believed Southerners could have eaten better during the Civil War if they'd only known their fungi.

Most field guides do not include the rarer oaks, but "Oaks of North America" has them all. The descriptions below of the seven least common oak species found in Georgia come, in condensed form, from that estimable book. — *Margaret Shannon*.

Arkansas oak, *Quercus arkansana* Sargent. Water oak, Arkansas water oak. Arkansas oak is a medium-size tree with a tall trunk and narrow crown. It reaches heights of 18 meters. It is slow-growing and short-lived. The name *arkansana* comes from the state of discovery.

Even though it bears a good crop of acorns, which appear to be viable, regeneration is sparse. Arkansas oak is believed to be a relic of an ancient population which at some time in the

past occurred over a much wider range than at present.

The National Register of Big Trees records the largest oak as 3.5 meters (11.5 feet) in circumference and 18.8 meters (61.7 feet) tall, with a crown spread of 20.1 meters (65.9 feet). It is growing in Howard County, Arkansas.

Bark: Thick and rough, black, and deeply furrowed into long, narrow, scaly ridges.

Leaves: Broadly obovate, 3 to 14 centimeters long and 2.5 to 6 centimeters wide, may be 3-toothed or slightly 3-lobed, with a rounded tip, light yellow-green above and paler below with tufts of hair in the axils of the veins.

Fruit: Solitary or in pairs; nut, 1.2 centimeters long, nearly round, less than one-fourth enclosed in a shallow cup with light brown scales. Nut at first green, then becoming brown with conspicuous striate pubescent surface. There are approximately 1,000 clean seeds per kilogram.

Twigs and buds: Twigs slender, brown, with conspicuous yellow-brown lenticels. Buds terminal, brown, 3 millimeters long, lateral smaller. The buds are ovoid and acute, scales nearly glabrous.

Shingle oak, *Quercus imbricaria* Michaux. Laurel oak. Shingle oak is a medium-size tree 15 to 20 meters tall with a handsome rounded crown and is, thus, a popular shade tree. The name *imbricaria* refers to overlapping, the original use of the wood being for shingles.

Shingle oak grows at an average rate, is moderately tolerant, and generally moisture-loving. It begins to bear fruit at about 25 years and produces average crops at two- to four-year intervals.

The National Register of Big Trees records the largest shingle oak as 5.4 meters (17.7 feet) in circumference, 24.3 meters (79.7 feet) tall, with a crown spread of 24.3 meters (79.7

feet). It is growing in Wayne County, Ohio.

Bark: Gray-brown, divided by irregular, shallow fissures covered by appressed light brown scales.

Leaves: Oblong to lanceolate, 7 to 15.2 centimeters long and 1.9 to 5 centimeters wide, smooth and shiny above, hairy beneath with yellow midrib; entire margin, slightly wavy with bristle-tipped apex.

Fruit: On stout stem, subglobose, 1.5 centimeters long; nut, chestnut-brown, obscurely striate, enclosed to one-half in a deep bowl-shaped cup with blunt, hairy scales. There are approximately 900 clean seeds per kilogram.

Twigs and buds: Twigs slender, dark green to reddish-brown, glabrous. The larger terminal buds to 6 millimeters long, sharp-pointed, angular, and covered with pubescent light brown scales with hairy edges.

Dwarf chinkapin oak, *Quercus prinoides* Willdenow. Chinkapin oak, dwarf chestnut oak. Dwarf chinkapin oak is frequently a small tree to 4 meters tall, but more often a stoloniferous shrub. The name *prinoides* refers to the resemblance of its leaves to those of the chestnut oak, *Q. prinus*.

Dwarf chinkapin oak occurs in the Central Forest Region on dry, rocky soils, often at the base of limestone shale outcrops.

The National Register of Big Trees records the largest dwarf chinkapin oak as 1.5 meters (4.9 feet) in circumference and 10.3 meters (33.8 feet) tall, with a crown spread of 15.2 meters (49.8 feet). It is growing in Swope Park, Kansas City, Missouri.

Bark: Gray, furrowed, and scaly.

Leaves: Obovate to oblanceolate, 5 to 9 centimeters long with 3 to 8 pairs of short, rounded teeth, green above and lighter below with a slight pubescence.

Fruit: Acorn 1 to 1.5 centimeters

long, enclosed about one-third in a cup with fine tuberculate scales.

Oglethorpe oak, *Quercus oglethorpensis* Duncan. Oglethorpe oak is a medium-size tree to 25 meters tall. It's often subject to epicormic branching along the trunk. When without leaves, it could be mistaken for white oak. Oglethorpe oak derives its name from Oglethorpe County, Georgia, where it was discovered and is found most abundantly.

Oglethorpe oak occurs infrequently in the Southern Forest Region, choosing better drained terraces and stream bottoms along minor streams.

It has the usual attraction for wildlife, but is a very low producer of acorns and is susceptible to fire damage. The total population of Oglethorpe oak is low. Due to very poor acorn production, seedlings are rare. The Oglethorpe oak is considered

Finding the oaks

Georgia's seven least common oaks and the counties where (according to "Atlas of the Vascular Flora of Georgia") they can be found:

Arkansas oak Randolph, Tift.

Shingle oak Bartow, Murray, Wilkes.

Dwarf chinkapin oak Cherokee, Cobb, Douglas, Newton.

Oglethorpe oak Greene, Elbert, Jasper, Oglethorpe, Wilkes.

Chapman oak Bryan, Camden, Charlton, Chatham, Clinch, Crisp, Echols, Glynn, Lanier, Liberty, McIntosh, Ware.

Myrtle oak Brantley, Bryan, Camden, Charlton, Chatham, Glynn, Liberty, Long, McIntosh, Pierce, Tattnall, Wayne.

Georgia oak Barrow, DeKalb, Gwinnett, Harris, Heard, Henry, Jackson, Meriwether, Morgan, Muscogee, Paulding, Pike, Polk, Rockdale, Spalding, Walton.

in the “threatened” category of the Smithsonian Report and a “protected species” in the state of Georgia.

The National Register of Big Trees records the largest Oglethorpe oak as 2.9 meters (9.5 feet) in circumference and 21 meters (68.9 feet) tall, with a crown spread of 24 meters (78.7 feet). It is growing near Lexington, Georgia, in Oglethorpe County. In February 1976, an Oglethorpe oak sapling was planted on the courthouse lawn in Lexington, Georgia. This sapling came from the same site as the champion.

Bark: Light gray and scaly.

Leaves: Deciduous, narrow elliptic to obovate, blunt at both ends, 5 to 13 centimeters long and 2 to 4 centimeters wide, entire except on vigorous branches when they are often slightly undulate, sinuate to almost lobed near the apex, glabrous above, yellowish pubescent and yellow midrib below.

Fruit: Solitary or paired, may be sessile or with stalk to 7 millimeters. Nut 1.6 to 2 centimeters long, dark brown, enclosed about one-third in cup with gray appressed scales.

Twigs and buds: Twigs brown tinged with purple at first, becoming grayish, lenticels conspicuous. Terminal buds up to 3 millimeters long with rounded dark gray hairy scales.

Chapman oak, *Quercus chapmanii* Sargent. Chapman white oak, scrub oak. Chapman oak is a small tree sometimes up to 15 meters tall, but more often a bushy shrub. It is slow-growing. The name *chapmanii* refers to Alvin Wentworth Chapman, physician and botanist of Apalachicola, Florida, the author of “Flora of the Southern United States,” who first distinguished and named this oak.

On sites where Chapman oak grows with other scrub oaks, the total contribution of mast is an important factor in overwintering whitetail deer and wild turkey. These oaks, including Chapman oak, are high producers of acorns.

The National Register of Big Trees records the largest Chapman oak as 1.3 meters (4.3 feet) in circumference, 17.6 meters (57.7 feet) tall, with a crown spread of 7.6 meters (24.9 feet). It is growing in the Ocala National Forest (in Florida).

Bark: Grayish brown with irregular plates or scales.

Leaves: Oblong, 4 to 9 centimeters long and 2 to 4 centimeters wide, margin wavy and often shallowly lobed near the apex.

Fruit: Sessile, ovoid, 1.5 to 2 centimeters long, nut dark brown to almost black, enclosed over one-half in a deep bowl-shaped cup composed of gray, appressed scales.

Twigs and buds: Twigs tannish gray, tomentose; the terminal buds are acute to 3 millimeters long with light chestnut-brown scales.

Myrtle oak, *Quercus myrtifolia* Willdenow. Scrub oak. Myrtle oak is a shrub or small tree rarely over 12 meters tall. The short, spreading branches and slender branchlets are intricately interlaced as a shrub. The name *myrtifolia* refers to the myrtlelike leaf.

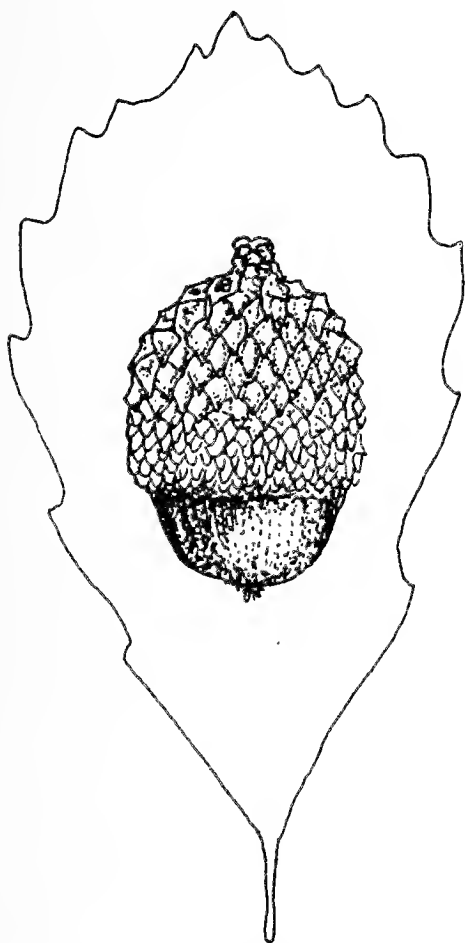
Myrtle oak is one of the more dominant members of the southern scrub oak forest, where bluejack, turkey, blackjack, sand post, sand live, and live oaks are usually found.

On the Big Hammock Natural Area in Georgia, near the Altamaha River, there is a vigorous example of this type.

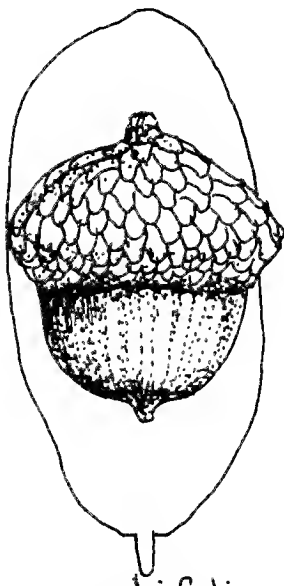
The National Register of Big Trees records the largest myrtle oak as 1.2 meters (3.9 feet) in circumference and 7.9 meters (25.9 feet) tall, with a crown spread of 10 meters (32.8 feet). It is growing at Fort Clinch State Park in Florida.

Bark: Thin, smooth, becoming dark and slightly furrowed near the ground.

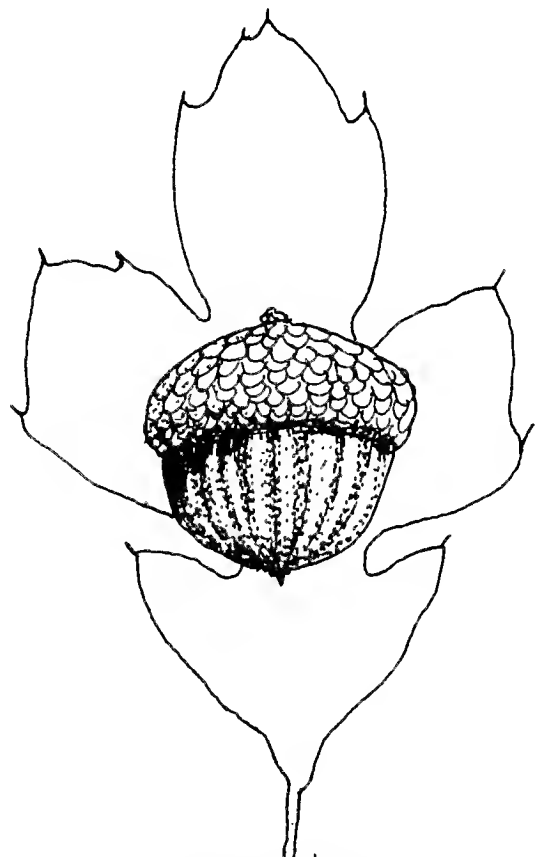
Leaves: Persistent, obovate or broadly oval, 0.9 to 5 centimeters long, borne on short petiole, shiny above



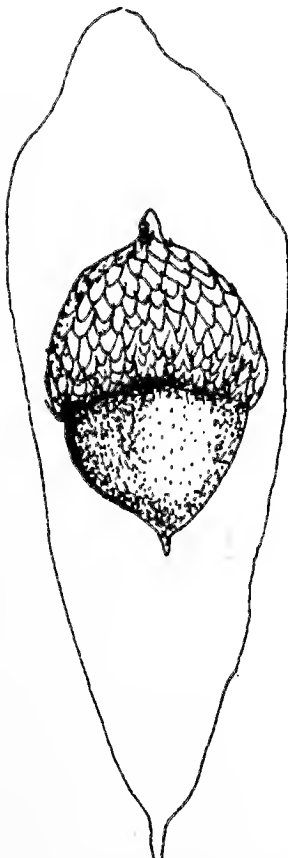
prinoides



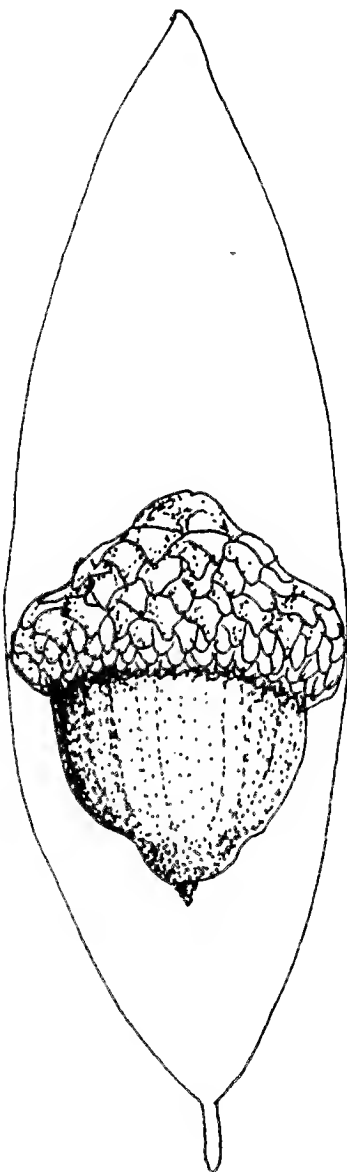
myrtifolia



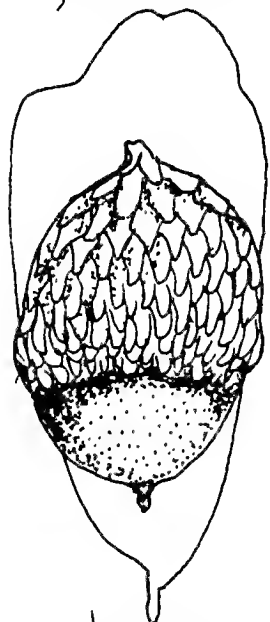
georgiana



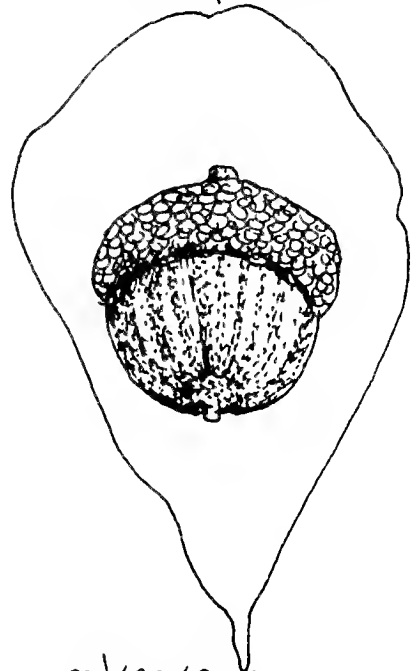
oglethorpensis



imbricaria



chapmanii



arkansana

Moses '86

Quercus

Leaves x 1/2 Acorns x 2

and dull below, revolute; at the apex there is frequently a short bristle. The underside is rusty, hairy in the axils of the veins.

Fruit: Solitary or in pairs, 0.6 to 1.2 centimeters long, nearly round, nut enclosed less than one-third in a shallow saucer-shaped cup with gray, appressed scales.

Twigs and buds: Twigs red or gray, pubescent during the first year, then glabrous. Terminal buds ovoid to oval, the largest bud to 3 millimeters long, narrow at the apex, with closely overlapping dark chestnut-brown scales.

Georgia oak, *Quercus georgiana* M. A. Curtis. It is a slow-growing tree with a compact crown reaching heights of 9 meters. Georgia oak derives its name *georgiana* from the state in which it was first described.

Georgia oak occurs sparingly in scattered stands on and adjacent to granite outcrops in the Piedmont Plateau of

Georgia and South Carolina. The Smithsonian Report lists Georgia oak in the "threatened" category.

The National Register of Big Trees records the largest Georgia oak as 1.0 meter (3.28 feet) in circumference and 14 meters (45.9 feet) tall, with a crown spread of 6.4 meters (21 feet). It is growing south of Warm Springs, Georgia.

Bark: Gray to light brown and scaly.

Leaves: Elliptical, 5 to 10 centimeters long, 2.5 to 5.0 centimeters wide, with 3 to 5 short, pointed lobes; shiny green above, paler below with axillary tufts of hairs.

Fruit: Sessile or short-stalked, 1.0 to 1.2 centimeters long, subglobose. Nut brown, enclosed one-fourth in a shallow saucerlike cup with brown overlapping scales.

Twigs and buds: Twigs slender, dark brown, with raised light brown lenticels prominent. Buds acute, round in cross-section; terminal buds to 6 millimeters long, dark brown, pubescent.

SELECTED READINGS

'This very curious tree'

American Camellia Yearbook, 1977, 1982.

Edmund Berkeley and Dorothy Smith Berkeley, The life and travels of John Bartram: from Lake Ontario to the river St. John, University of Florida Press, 1982.

Keith Coulbourn, On the trail of the fabulous *Franklinia*, The Atlanta Journal and Constitution Magazine, December 12, 1971.

Louis De Vorsey, editor, William DeBrahm: Report on the general survey in the southern district of North America, University of South Carolina Press, 1971.

Stephen Elliott, A sketch of the botany of South Carolina and Georgia, 1824.

Joseph Ewan and Nesta Ewan, John Lyon, nurseryman and plant hunter, and his journal, 1799-1814, Transactions of the American Philosophical Society, 1963.

Joseph Ewan, editor, William Bartram: botanical and zoological drawings, 1756-1788, American Philosophical Society, 1968.

Francis Harper, editor, The travels of William Bartram, naturalist's edition, Yale University Press, 1958.

Francis Harper and Arthur N. Leeds, A supplementary chapter on *Franklinia alatomaha*, Barton, 1938.

Hsuan Keng, Comparative morphological

studies in Theaceae, University of California Publications in Botany, 1962.

C. F. Jenkins, The historical background of Franklin's tree, Pennsylvania Magazine of History and Biography, 1933.

J. Robert Sealy, A revision of the genus *Camellia*, 1958.

Edgar T. Wherry, The history of the Franklin tree, Journal of Washington Academy of Science, 1928.

C. E. Wood Jr., The genera of Theaceae of the southeastern United States, Journal of the Arnold Arboretum, 1959.

An expanded version of the authors' footnotes for this article is available by writing to: Margaret Shannon, executive editor, Tipularia, 570 Lakeshore Drive, Duluth, Georgia 30136.

The crane-fly and the moth

Donovan S. Correll, Native orchids of North America north of Mexico, Chronica Botanica, 1950.

Wilbur H. Duncan and John T. Kartesz, Vascular flora of Georgia: an annotated checklist, University of Georgia Press, 1981.

Carlyle A. Luer, The native orchids of the United States and Canada excluding Florida, New York Botanical Garden, 1975.

Marie B. Mellinger, Atlas of the vascular flora of Georgia, Georgia Botanical Society, 1984.

Warren A. Stoutamire, Pollination of *Tipularia discolor*, an orchid with modified symmetry, American Orchid Society Bulletin, 1978.

*The life and times
of a spry
60-year-old*

Botany for breakfast

BY MARIE B. MELLINGER

ILLUSTRATED BY BILL CLOSE



A lone botanist can have a delightful time browsing through botany books or keying out a new-found plant. Two congenial botanists can reach a high level of compatibility, in the field or out. Three or more botanists together can get involved in friendly, but sometimes acrimonious confrontations. "It is a whoopy-eyed daisy!" "It is not a whoopy-eyed daisy!" "Dr. So-and-so says it is a hybrid!"

A whole Society of botanists can — and did — lead to a classic remark that is now part of Bot Soc legend. On the last morning of a weekend-long Wild Flower Pilgrimage as breakfast-table talk inevitably turned botanical, a long-suffering husband looked up from his bacon and eggs and said in a voice that everyone could hear: "I don't mind botany for lunch and botany for dinner and botany in between, but I'll be damned if I'll have botany for breakfast!"

This is the story of the Georgia Botanical Society from its founding 60 years ago. The Society has never been a group of stodgy old ladies in tennis

shoes. Its membership has boasted the botanical greats of modern Georgia. It has been led by dynamic, obstinate, vocal, and dedicated individuals who have sold the idea of preserving wild plant species and habitats to their own group and to the rest of the state. The Society has never avoided controversy, and actually enjoys a good fight for a good cause.

The dual nature of the Society is expressed in the theme of its 1969 year-book: "The beauty of nature and man's environment." The enjoyment of woodland rambles, the soul-enriching experiences brought by association with wild flowers and ferns, and the ever-increasing concern that they be protected for future generations to enjoy — all are part of that theme.

I came into the club to help lead a field trip to Rabun Bald in 1964. I ached to belong and waited and waited to be asked to join. Finally I became a member in 1967. Writing this history is traveling down memory lane among experiences that are colored by the feelings of the writer.

To Norma Seiferle and Lynn Hill, who brought the Georgia Botanical Society from obscurity to a living, growing, powerful statewide organization, this history is affectionately dedicated.

Beginnings. The Georgia Botanical Society was founded in November 1926 by Eugene Scofield Heath with 14 hand-picked members. He was its leader and president until 1952. A good botanist, he was a graduate of Ohio Wesleyan College, with a master's degree from Nebraska State University and graduate work at the University of California and the University of Chicago. He taught at Agnes Scott, Brenau, Oglethorpe, and the University of Georgia. He founded the Atlanta Camellia Society — camellias were his favorite flower — and was a life member of the American Association for the Advancement of Science.

The Botanical Society should have been called the Heath Society, for he was the absolute ruler. He planned all meetings and a banquet held every November. Early members say he was a charmer, but as opinionated as all get-out. Their recollections are very vivid:

“He became angry if anyone corrected him. On his carefully planned afternoon field trips, he was the master.” “You didn’t dare ask questions, other than the name of the plant. He named things as you tagged along.” “He assumed that the average person was not capable of learning any botany.” “He carried a hand lens, but I never saw him carry a botany book. He never admitted that there might be a plant he did not recognize.” “He never showed excitement over finding a new species. He had an enduring interest in plants, but a large ego.”

Mr. Heath’s wife, Virginia, has been described as “a real Southern lady,” always gracious. “When Mr. Heath was ornery, she was very diplomatic, always trying to smooth things over,” an early member says. Mrs. Heath gave

camellias to those who were ill, spent much time serving tea, and arranged rides for members to meetings and field trips.

Mr. Heath started with the idea of a statewide organization, but no one could approach his power structure. So the Society remained a small, exclusive Atlanta group.

In 1952, Mr. Heath bequeathed leadership of the Society to Norma Seiferle, the only member whom he considered academically qualified. In 1968, after the democratic process of an election, Lynn Hill became president. Norma was president again in 1969, and after her came Marie Mellinger, Eugene Cline, John Bozeman, Steve Bowling, Helen Brown, Newell Good, Marie again, and David Emory.

If the ghost of Mr. Heath haunted the paths of the Botanical Society garden or looked over Mary Izard’s shoulder as she served artichoke hearts on the banks of the Flint River, we wonder what he thought. How would he like the “Bot Soc” label coined by Carol Ruckdeschel and given prominence in print by John Pennington? How would he like our irrepressible youngsters (and oldsters) in their cutoff blue jeans, clambering down into Providence Canyons or gathering in rain, sleet, or snow to explore the out-of-doors? Would he have faced down the Georgia legislature to get the rare plant protection law on the books?

One longtime member says that Mr. Heath “never realized his potential or the real potential of the Society because he limited himself and others by his own irascibility.” But we salute him!

For reminiscences and information on the early days, I am indebted to F. Clarke Douglas, Nellie Jane Gaertner, Rufus Godwin, Lynn Hill, Norma Seiferle, and Marene Snow.

It never rained on Vivian! Field trips have always been the most favored activity of the Society. In the early days, they were always in or near Atlanta, to



members' gardens or to nurseries, among other places.

One early trip was to West Paces Ferry to see *Stewartia* growing along the Chattahoochee River. After the group had walked a half block, one member couldn't cross a ravine on a log, tried to jump across, fell in the mud, and cried. That was the end of that field trip.

The early Society also visited Rottenwood Creek, Kennesaw Mountain, and the Piedmont Park Garden for the Blind. Field trip reports always mentioned refreshments, among them ripe persimmons, blueberries, and serviceberries.

Eventually, trips were extended to other parts of the state. In 1969, the Society made its first visit to the Barbers' pitcher plant bogs near Moultrie and the Ogeechee River sandhills. Trips beyond Atlanta included Burnt Mountain, Cooper Creek, Tray Mountain, and Panther Creek.

Field excursions to granite outcrops

— Mount Arabia, Panola, Stone Mountain, Flat Rock, and Heggie's Rock — have always been very special, led by such authorities as Haskell Vernard, Norman Butts, Robert Platt, and Madeline Burbanck.

In 1970, the Society became involved in the biological survey of the Chattahoochee National Forest. The first field trip, led by William Craig, was to Yonah Mountain. Eventually every county was explored, and the plant lists made then were the beginning of our range record project that culminated in the Society's publication in 1984 of our "Atlas of the Vascular Flora of Georgia," which contains maps showing the distribution of 2,697 species of plants in the state.

We have also journeyed into North Carolina with trips to Pickens Nose, Cherokee Cave, and Highlands Biological Station and to South Carolina to view and attempt to save the Oconee bells. We have repeatedly

visited favorite people at Gardens di Pajarito at Canton, Stillhouse Farm, and Tall Timbers Research Station. In 1972, we went on our first fungus walk, and this has become an annual affair, led by Bill Craig or Monte Howell.

The first Wild Flower Pilgrimage, a field trip expanded to weekend length, was held in Rabun County in 1970. The idea was an instant success. The annual pilgrimage serves as a meeting place for old friends and an introduction for new faces. A special dinner and outstanding evening speakers add to the event. We've held pilgrimages in Rabun County, and especially at Tumbling Waters Camp, at Helen, Calhoun, Dalton, Toccoa, Milledgeville, Moultrie, and St. Simons.

Bot Soc field trips visit unique plant communities, gardens, and arboretums. Most favored are safaris into the wild to see a walking fern, the last untouched mountain wilderness, or some other wonder. Many members combine photography or nature writing with their interest in botany. Under such great field trip leaders as Steve Bowling, Vivian Emerson, Georgine Pindar, and Daisy Arrington, we have been led into adventures. The weather usually smiles on these field trips. In fact, we always declared, "It never rained on Vivian!"

So many memories. All the strange places with strange names: Dugdown Mountains, Yahoola River, Yellow Jacket Shoals. We loved them all. Highlights must always be the acres of yellow pitcher plants glowing in the sun, the snowdrifts of *Elliptia racemosa*, the diamorpha on Heggie's Rock, rain pouring down on Panther Creek and the Oconee National Forest.

We remember the forester lost in an early fall snowstorm on Pine Log Mountain. The little girl who was persuaded to leave her turtles at the bottom of a mountain and collect them on the way back. The first glimpse of two acres of club moss spread out before us. Discovery of the paper plant on Wolf Creek. The rattlesnake on Pine Log

Mountain. Norman Butts' excitement when he saw the pink fly poison on Rabun Bald. The glories of Pumpkinvine Creek. The fun and fellowship. The first time I walked on Arabia with Marene Snow. We have had them all.

*For we have walked on Scuffle
Bluff, and shared Enotah's
cooling shade,*

*For we have walked where
trilliums talk, in every cove
and mountain glade,*

*We have searched for fern and
flower, on Mount Panola's
rocky face,*

*And where the Coosawattee flows,
we've searched for spleenwort's
hidden lace,*

*For we have gone awandering,
in springtime and in fall,
And in the end remember the
wonder of it all.*

The garden. Mr. Heath had a dream of a botanical garden for Atlanta. At one time there was the prospect of a magnificent site on Utoy Creek in southwest Atlanta. Many nurseries donated plants, and preliminary planting was done. There was also an attempt to start a garden on Stone Mountain.

The garden idea was revived in 1965 when Norman Butts dreamed of a natural arboretum at the new governor's mansion on West Paces Ferry Road in Atlanta. Norma Seiferle was president at that time, and the garden idea advanced under her leadership and that of Lynn Hill.

This time, the project went further than ever before. Most of 1967 and 1968 was spent clearing the area, eliminating privet and Japanese honeysuckle, and waiting for the state to put in necessary grading and drainage. Plantings began in the fall of 1968.

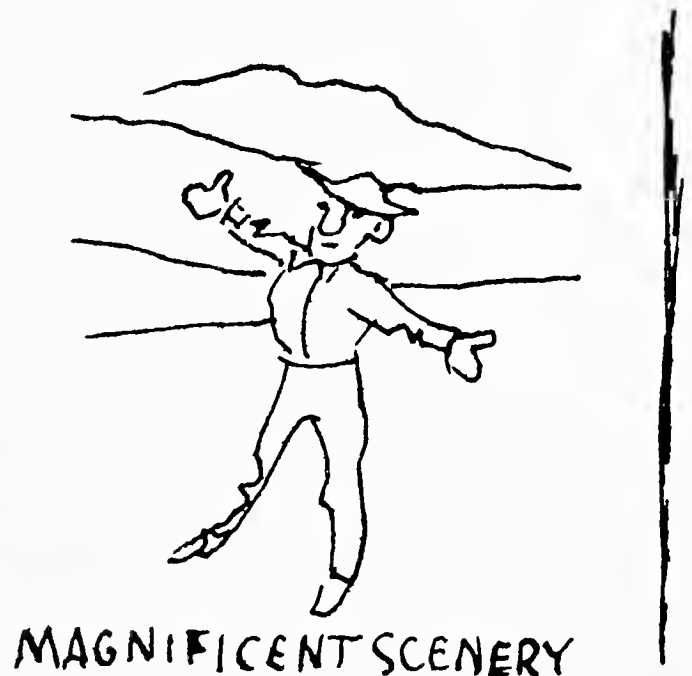
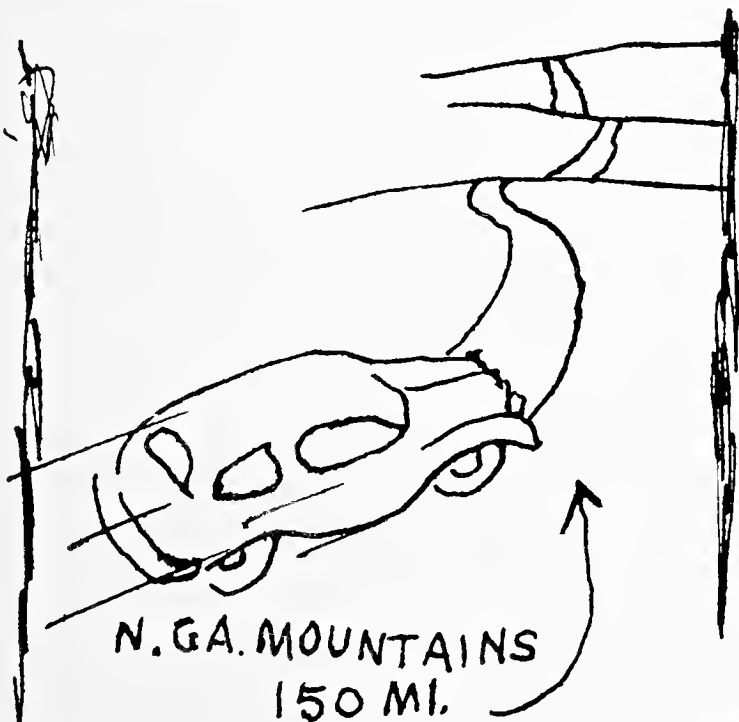
In 1969, the state contributed \$2,644.50 worth of plants, trees, and shrubs and paid for their planting. In

September of that year, Lynn Hill reported in the Bot Soc Newsletter: "The wild garden at the Executive Mansion is underway. The job of constructing paths and steps and planting of shrubs to screen the driveway has been completed. The other major construction work — a storm drain and underground pipes for flood control — will be arranged. As soon as major construction jobs are completed, we will be able to make our project a reality." Lynn and Norma alternated as garden co-chairwomen until 1970, when Alice Peacock took over. In 1973, Mary Izard joined Alice as co-chairwoman.

By March 1970, the Newsletter reported: "Plantings have been made along the driveway and in the back part of the garden."

Much of the plant collecting was done under the guidance of Lucy Smethurst. In May 1971 the Newsletter reported: "Lucy made trips to Mount Arabia, south Georgia, north Georgia, and North Carolina. Lucy never tires; she digs from dawn to dark, hefting vast loads of plant materials, mostly from plant communities in the path of developers and highway crews." Plants also were donated from Bot Soc members throughout the state from their own gardens.

Financing was always a headache, but Bob Schwind and Gene Cline came up with the idea of plant sales. People made generous contributions. Tom Dodd sent a truckload of native shrubbery from his nursery in Alabama. The state agreed to pay the salary of James



Dougherty, our interesting and proficient gardener.

By the end of 1974, the garden had reached its capacity of trees and shrubs, and only still-missing species of ferns and wild flowers were planted.

In 1975 two tornadoes struck, one natural and one political. In the first, trees were uprooted and parts of the garden were devastated. Then, in the second tornado, the Botanical Society was ordered to move the garden "for reasons of security."

Bot Soc's executive committee voted to accept an offer to transfer the garden to the Swan House woods at the Atlanta Historical Society. Steve Bowling became head of the garden project and began a ten-year struggle with finances and help to try to re-create a successful wild flower garden on the new site. In 1986, an agreement reached with the Historical Society brought the project to an end, and Steve was authorized by the Botanical Society to distribute plants belonging to our organization.

Programs, projects, and personalities. Through the years, the Society has had interesting and informative programs to educate and entertain the membership and friends. Talks have ranged from such erudite subjects as "Experimental Taxonomy" and "The Genetic Basis of Plant Breeding" to "A Continuing Love Affair With Ferns" and "Eating the Landscape." Talks on plant families and habitats have always been popular. Classes have been offered on plant identification also. Officers and members have taken part in fairs, conferences, and garden shows.

If controversy has sometimes raged within the Society — on weeds in the garden, on the use of herbicides, and for and against scientific collecting for herbariums — it has served to enrich our growth. The Society has survived!

The Botanical Society has long joined in the conservation movement. We took an active part in the battle against the extension of the Blue Ridge Parkway

and the road up the back side of Brasstown Bald. We won the fight to save Pine Log Mountain and have tried to help preserve the Flint River and Hurricane Creek. We won the fight for a rare plant protection law.

We have worked for and against the National Forest Service since the biological survey in 1970-1971. We worked hard for the Cohutta Wilderness and won a 20-year struggle when the Southern Nantahala Wilderness was signed into law in 1985. We are working to get more Botanical Areas, especially Cedar Creek, added to the long-range National Forest management plan. We have also aided in the fight to save Chenocetah Mountain.

We actively support the Georgia Conservancy, the Chattahoochee River Coalition, the Georgia Environmental Council, the Non-Game Conservation Coalition, the Sierra Club, the Wilderness Society, Atlanta Audubon, and Friends of the Mountains. In 1984 we took on Duke Power Company in South Carolina in order to give added protection to the Oconee bells, *Shortia galacifolia*. In 1985 we made a determined effort to save Mulberry Road and the Cherokee Cave area with input into National Forest management plans in North Carolina.

As part of a continuing service, we do surveys and plant listings for groups, individuals, or organizations on our own time and at our own expense. In the past we have done listings for the U.S. Forest Service, Westville Village, East Point, and Chicopee Woods.

Any society is made up of members; without them it is nothing. It is also made up of officers and committee chairpersons. They carry on business meetings, committee meetings, and executive meetings — all the nitty-gritty work, much of it behind the scenes, that makes the Society a success. Our Newsletter editors have the important job of getting information to the membership; without them, the Society would fall on its collective face.

There are so many compensations, such as the fun and fellowship built up over the years, the discovery of new plants or new areas, the "something lost behind the ranges." All lure us on. To an ardent botanist the discovery of a new plant ranks with a view of the Taj Mahal or a climb to the top of Mount Shasta. So ardent are some of our botanists in the urge to discover something new and rare that they sometimes discover plants where they don't grow or fail to recognize old familiars with minor variations of leaf form, size, or flower color. The Georgia Botanical Society, however, can claim

some genuine discoveries and has contributed much to the knowledge of the flora of Georgia.

We have been, and are, a dedicated group, but, as a foreign visitor said, "Bot Soc members are loud, opinionated, sometimes rude and inconsiderate, but never, never dull!"

Really, we are sweet, lovable, handsome, and fascinating!

We will continue to grow and expand. Sometimes in the process we may step on a few cherished traditions, but we are a living, vital force for the future. Long may the Bot Soc flag wave over Georgia!

BOOK REPORT

Wild flowers with personality

BY SALLY-BRUCE McCLATCHEY

For the Love of Wildflowers by Barrie F. Crawford. Drawings by Faith E. Birkhead. Photography by Michael C. Crawford. Buckeye Press, 1985. \$27.95.

At last a book to cover the flora of our Piedmont area of Georgia. And how well the title says it. Barrie Crawford has given us a delightful book to be savored by both professionals and nature lovers alike.

A native of Columbus, Georgia, Barrie was born into a family with an appreciation for the richness of our native plant heritage. She, in turn, inspired her husband, Michael, to direct his hobby of photography toward her beloved plant life. Their collaboration has contributed to an outstanding record of both common and rare wild flowers of the upper half of the state.

The book has an interesting format designed around the cycle of the seasons. Drawings by Faith Birkhead illustrate each plant described, and there are color photographs of many species. There are sections on types of plants, such as vines, shrubs and trees, weeds, and even hard-to-love "beasts." She treats wild-flower gardening briefly and concludes with character sketches of some of the more interesting gardeners she has known.

Much of the book's appeal is in the writing. Barrie treats plants as old friends with distinct personalities. With senses sharpened for new appreciation, we want to join her in her rambles.

RESEARCH REPORT

Logging, ferns, and pecan weevils

EDITED BY HARRIETT L. WHIPPLE

Dr. Don Drapalik, associate professor of biology, Georgia Southern College, Statesboro, is studying the growth and flowering responses of *Elliottia racemosa* Muhlenberg ex. Elliott in reference to logging disturbances. He also is continuing his work on *Matelea*.

Eddie Beard, M.S. Georgia College, Milledgeville, explored the ability of *Polypodium polypodioides* gametophytes to withstand desiccation. The work is presently being prepared for publication.

Dr. Dennis Ring, Agricultural Research Services, U.S. Department of Agriculture, Byron, Georgia, is determining the host range of the pecan weevil. He is looking for stands of hickories infested with the weevil. Of special interest are bitternut hickory (*Carya cordiformis*), shellbark hickory (*C. laciniosa*), water hickory (*C. aquatica*), shagbark hickory (*C. ovata*), and mockernut hickory (*C. tomentosa*).



JOHN WORK GARRETT COLLECTION, MILTON S. EISENHOWER LIBRARY, JOHNS HOPKINS UNIVERSITY



*Caterpillar of silver-spotted fritillary butterfly feeds on passion flower, *Passiflora incarnata* (above). Sea-island cotton (left), *Gossypium barbadense*, is the food of choice for the cotton moth. Swallow-tailed skipper butterfly enjoys *Clitoria mariana*, known as the butterfly pea (opposite page).*



PRIVATE COLLECTION

Feeding the *Lepidoptera*

Artist-naturalist John Abbot provided many of his painted insects with a feast of their favorite plants

BY TREADWELL RICE CROWN III

John Abbot chose a life of seclusion, an affinity that many of his artistic subjects shared. Unfortunately, his detachment has left scant knowledge of his abilities and talents and, amazingly, even of the work which has outlived him.

Abbot was born in London in 1751 and received artistic instruction early on, though notably none in watercolor techniques. By the age of 16 he had mastered the use of watercolors and was producing a good quantity of good-quality paintings, especially of insect specimens.

Despite his father's desire for him to become a lawyer, Abbot was ever more strongly attracted to the world of

natural history. Finally, in 1773, sponsored by friends and backers, he sailed for Virginia. He lived in Virginia for two and a half years, but changing conditions led him to Georgia, where he remained until his death 64 years later.

Abbot moved several times in Georgia — from Augusta to Burke County, then to Chatham County, and finally to Bulloch County. He taught school for a short time to supplement his income from insect collections and watercolors, but soon came to rely almost solely on sales of his work, primarily to English patrons.

In his early paintings Abbot tended to treat plants as stylized caricatures providing landscape effects. As his

powers of observation grew, he began to represent the flora more accurately, but it was not until 1805 that a friend and fellow naturalist, Savannah pharmacist Augustus Oemler, set forth to him the Linnaean principles of binomial nomenclature based on floral characteristics. In future paintings Abbot put as much care and precision into his plants as he did into his creatures.

“The Natural History of the Rarer Lepidopterous Insects of Georgia” (1797) was Abbot’s first published work and is his best-known. While showing the life cycles of various moths and butterflies, it also shows their food plants. The two-volume set was published by James Edward Smith, father of the Linnaean Society of London, from his collection of Abbot paintings. Smith edited Abbot’s comments and added the Linnaean binomial to Abbot’s common name for both plant and insect.

The food plants depicted provide a botanical treat. The well-detailed portraits often include the plant in flower, a bright contrast to the insect upon it. Abbot’s work also documents some alien plants which were introduced or naturalized in Georgia by the late 18th century as well as the lovely native flora, not often thought of as caterpillar cuisine.

He shows, for instance, the *Passiflora incarnata* Linnaeus, the passion flower or maypops, which he calls “Maycock or Flesh-Coloured Passion-Flower,” providing sustenance to a larva of *Agraulis vanillae nigrior* Michener, the silver-spotted fritillary butterfly. His colorful rendering is a work of both movement and placement, with the entire page full of life and detail.

Abbot normally restricts his accompanying comments to the pictured insect’s life cycle, but he feels compelled to break his pattern to discourse upon the passion flower: “...when ripe the pod is full of seeds, surrounded with a pale yellowish pulp. Tastes like an orange but fainter. It is eaten by many

people. Is a troublesome weed where it once gets any footing.”

Abbot provides an exquisite *Clitoria mariana* L., the butterfly pea or pigeon wings, as repast for the swallow-tailed skipper butterfly, *Urbanus proteus* L., which is known to its intimates today as the bean leafroller. His “Large Red Clitoria, or Pea Vine” is as delicate as his passion flower is rampant. While found throughout Georgia, this little sylvan nymph seems to prefer the woods edge, finding the dappled shade a more discreet habitat than the harsh and brazen full sun so many vines clamber after.

It is certainly harder to find references to this charmer in literature than to find it in the woods. Even the thorough “Taylor’s Encyclopedia of Horticulture” finds staid Norman Taylor at a loss for words, warning that the origin of the name is “unprintable,” although to the enlightened botanizer of the 1980s it is fairly obvious.

Abbot’s painting of *Schrankia microphylla* (Dryander) Macbride, sensitive briar, circa 1782-1792, is the first known illustration of the species. “Sensible Briar or pouting Briar,” as he labeled it, went through many scientific name changes and controversies before achieving its present binomial in 1919, according to Joseph Ewan’s notes in “John Abbot in Georgia: The Vision of a Naturalist Artist (1751-ca. 1840).” This catalogue to the exhibition of the same title at the Madison-Morgan Cultural Center in 1983 is the work upon which this article is primarily based.

Ewan also informs us that Abbot’s *Wisteria frutescens* (L.) Poiret is the first known painting of our native wisteria, then referred to as shrubby glycine or *Glycine frutescens*. Mark Catesby, the English naturalist who was in America in 1712-1719 and 1722-1726, is credited with its introduction to British gardens, but Thomas Nuttall finally named the vine wisteria in 1818.

Clematis reticulata Walter also created some confusion. It was named that by Thomas Walter in 1787, but Abbot's publisher, Smith, apparently was unaware of this and in his published collection of Abbot paintings named it *Clematis rosea*. Walter's name prevailed.

Georgia's shrubs are not neglected by caterpillars, so they were not neglected by Abbot. His "Red and White Azalea, or Wild American Honeysuckle" is still referred to in folk culture as mountain honeysuckle or honeysuckle bush; it is known to the more cosmopolitan crowd as the Piedmont or pink azalea. Many Yankees make the same mistake that publisher Smith did and, instead of identifying it as *Rhododendron canescens* Michaux, confuse it with the more northerly *R. nudiflorum* (L.) Torrey, the pinxter-flower.

Abbot painted another first when he portrayed the black-streaked ermine moth, *Sierarctia echo* J. E. Smith, munching on a ground oak, which was unidentified by Smith. This Abbot illustration of *Chrysobalanus oblongifolius* Michaux predates French botanist Andre Michaux's "Flora Boreali-Americana" (1803) by five years. The ground oak, or gopher apple, is indigenous to the Coastal Plain of Georgia.

Another of Georgia's lesser known plants illustrated by Abbot is *Ptelea trifoliata* L., the wafer ash or hop tree, an interesting, but unprepossessing small tree. Stephen Elliott used a specimen supplied by Abbot for his description of the species in "A Sketch of the Botany of South-Carolina and Georgia" (1821-1824).

Another among the trees displayed by Abbot is *Liriodendron tulipifera* L., the tulip poplar. His watercolor is of an open blossom surrounded by leaves being nibbled on, of course, by *Epimecis hortaria*, the carpet or poplar beauty. The portrayal is all the more singular for the unusual shape of the



John Abbot self-portrait.

leaves, although a herbarium specimen with leaves of the same shape does exist. It was collected by Joseph Ewan on the shores of Mobile Bay, Alabama.

Another native beauty portrayed by Abbot, though not included in Smith's collection, is *Pinckneya bracteata* (Bartram) Rafinesque (*Pinckneya pubens* Michaux), the Georgia feverbark tree, which is found in the Coastal Plain of Georgia. There is still a colorful controversy smoldering over its correct specific epithet. Apparently everyone who saw it had to name it.

Pinckneya's common name comes from the use of an extract made from the bark to treat malaria, a logical use since the feverbark tree is close kin of the Peruvian cinchona tree, source of commercial quinine.

John Abbot's work also serves as historical documentation of some plant introductions to the state, whether crop, garden flower, or weed. A primary member he recorded with pen and brush is *Gossypium barbadense*

L., sea-island cotton. This was already an important crop in the southern United States at the time of his painting, the end of the 18th century. It is a native of tropical America, but had come to Georgia from the Chelsea Physic Garden in London.

Two more building blocks of the South's agricultural economy, both also native to the Americas, were recorded by Abbot: the sweet potato, *Ipomoea batatas* (L.) Lamarck, and tobacco, *Nicotiana tabacum* L.

Another introduction illustrated by Abbot, *Foeniculum vulgare* Miller, was certainly brought over from Europe by the colonists as their important herb fennel. Also coming in by that route and illustrated by Abbot is *Plantago major* L., known to us as plantain weed and bane of the lawn, but known to the Indians as "white man's foot." What a legacy!

One of the most cosmopolitan of introductions painted by Abbot was *Melia azedarach* L., the chinaberry or Pride of India, known to him as the bead tree or Pride of China. The chinaberry is a native of Persia, but was rapidly disseminated around the world. John Tradescant grew it at his home near London in 1656, and it has made itself right at home here in the South.

It is hard to believe, but Abbot even was able to paint the Seville orange, *Citrus aurantium* L., in Georgia.

While fascinating and curious like his unusual portrayals, Abbot shunned public notice and the public. His many new discoveries and pictorial descriptions reached the scientific world not through him, but through others with whom he corresponded or to whom he sent specimens or sold paintings.

His existing work is spread around the world and not often come upon unless actively sought out. The Madison-Morgan Cultural Center exhibition of his work was the first ever assembled. This was done with the help and curatorship of Vivian Rogers-

Price, who is principal author of the catalogue from which this article is derived. Mrs. Rogers-Price is working on a biography of Abbot. Joseph Ewan, Ida Richardson professor emeritus of Botany at Tulane University, served as scientific editorial consultant to the exhibition, and his knowledge, insights, and perspective enriched the process and the product.

The catalogue is available from the Madison-Morgan Cultural Center, Madison, Georgia 30650.

FIRST PERSON SINGULAR

Through the duff

BY ANSELM ATKINS

Every spring I ritually resort with my wife to the woods adjoining the Cerebral Palsy Center in Atlanta. Our quarry is the early hepatica. These woods — 20 or 30 acres — are an unadvertised adjunct to the virgin forest at Fernbank Science Center.

It was in these Palsy Woods (as we call them) that we first identified wild flowers from Justice and Bell's North Carolina handbook. We discovered a good mix of northern woodland species, including four trilliums, one of which, *Trillium viride* var. *luteum*, was an out-of-range species.

And so we still make our annual pilgrimage, at just the right time, to see the first flowers peeping through the duff. We enter from the school side, following the beginnings of a dry gully. No one could imagine what we're up to. We shuffle through thick leaves. Trees are still bare. Birds are scarce — might see a robin or woodpecker or flight of waxwings, and once a hawk.

The gully gets deeper as it scores the gently sloping hill. What trees are newly fallen? What's this pile of trash doing here! If we're a little late, there might be a scattering of windflower to distract us. Christmas ferns appear exhausted.

But our minds are on hepatica. White it may be, or lavender blue. There won't be more than a handful, but we will find them. Then one of us sees it: a tiny, lone flower. Then more. Always we find it. Every year.



3 5185 00269 4691

BYLINERS

Artists

Blanche Ames married Harvard orchidologist Oakes Ames in 1900, bore him four children, illustrated his works, and designed his tombstone. *The George Plimpton* is her grandson.

Faith Birkhead drew her first wild flowers after marrying and moving to Texas. She is now an architectural interior illustrator in Columbus, Georgia.

Bill Close has retired after 30 years as art director of Rhodes, Inc. He and wife Anna Belle (see below) live in Decatur, Georgia.

Mozelle Funderburk is a maker of museum models, primarily of flora and fauna, and an illustrator of scientific subjects from astronomy to zoology. "Moses" lives at Stone Mountain, Georgia.

Patty O'Keefe Hutton of Decatur, Georgia, studied fine arts and combines art and nature in basket-weaving and work at the Outdoor Activity Center in Atlanta.

Pierre-Joseph Redoute (1759-1840), the most famous botanical artist of his day, was favored by Napoleon's Empress Josephine.

Authors

Anselm Atkins lives at Decatur, Georgia, and is editor of *Wingbars*, the monthly newsletter of the Atlanta Audubon Society.

John R. Bozeman is assistant chief, Marsh and Beach Section, Coastal Resources Division, Georgia Department of Natural Resources, Brunswick, and taught at Georgia Southern College, Statesboro, in 1964-1975.

Anna Belle Close worked indoors at Emory, Higgins-McArthur, and the Federal Reserve Bank before retiring, but says she is really an "outdoors girl" at heart.

Treadwell Rice Crown III also answers to Rick and Ricky. His horticultural roots include a grandmother who was a widely known camellia grower.

Vivian Emerson and husband Lyman live alongside Lake Lanier, near Cumming, Georgia, and often venture forth by canoe or van to see the wonders of nature.

David L. Emory, 1985-1986 president of the Georgia Botanical Society, grew up on Long Island, New York, at a plant nursery in his family for five generations.

Philip F-C Greear, one of Georgia's most distinguished environmentalists, retired June 30 as professor and head of the Department of Biology and Earth Science at Shorter College, Rome, Georgia.

Sally-Bruce McClatchey is librarian archivist at the Cherokee Garden Library in Atlanta. Many Georgia Botanical Society records are deposited there.

Marie B. Mellinger is famous for her skill at plant identification in the field. She also is a fierce opponent of clear-cutting.

Howard A. Miller of Marietta, Georgia, spent a lot of time with trees in a career with the National Wildlife Refuge program, Fish and Wildlife Service, and Forest Service.

Martha Fort Prince, Alabama-born artist, writer, and photographer and a graduate of Piedmont College, Demorest, Georgia, lives and gardens on Long Island, New York.

George A. Rogers, professor emeritus of history at Georgia Southern College, Statesboro, and co-author of "Swamp Water and Wire Grass," often writes about local Georgia history and the early botanists. He has a full-scale biography of Stephen Elliott underway.

Miriam Talmadge spends lots of time in the mountains, at Suches, Georgia, and a little in Athens. She edits *Bot Soc's Newsletter* and enjoys writing, bird- and woods-watching, the universe, and grandchildren.

Editors

Treadwell Rice Crown III has a B.S. in plant and soil science from the University of Tennessee and since 1982 has been manager and horticulturist at Cedar Lane Farm, Madison, Georgia, a wholesale nursery specializing in native plants.

David L. Emory received his B.S. in botany at Oberlin College and M.S. in biology at the University of Virginia. He taught high school science and mathematics for 26 years and is now a legal assistant in an Atlanta law firm.

Wayne R. Faircloth, B.S. Valdosta State College, M.Ed. University of North Carolina, Ph.D. University of Georgia, is professor of biology and head of the Department of Biology at Valdosta State. His research interests include the floristics of the Atlantic-Gulf Coastal Plains and the biosystematics of *Ophioglossum* and *Baptisia arachnifera*.

Marie B. Mellinger of Tiger, Georgia, free-lance author, photographer, and naturalist, is a two-term past president of the Georgia Botanical Society and compiler of its "Atlas of the Vascular Plants of Georgia."

Harriett L. Whipple, B.S. Furman University, M.S. Clemson University, Ph.D. University of North Carolina, is a professor at Georgia College, Milledgeville. Her special interests are field botany and environmental education.

Margaret Shannon, B.J. University of Missouri, is a longtime Atlanta journalist with a longtime interest in wild flowers.

SITE-SEEING

Good luck at Sosebee Cove

BY VIVIAN EMERSON

Sosebee Cove offers a special treat to the lover of wild flowers. It is well worth a visit at any time of the year because of its splendid trees as well as its numerous species of wild flowers.

Here are some of the species found in the cove: Dutchman's breeches, squirrel corn, umbrella-leaf, great white trillium, showy orchis, the rare Goldie's woodfern, Canadian ginger, giant chickweed, trout lily, toothwort, Canada violet, flowering raspberry, red bee-balm, Turk's-cap lily, both black and blue cohosh, May-apple, and many other familiar and some extremely rare flowers.

Among these are the ramp, spring beauty, yellow lady's slipper, both mandarin and yellow mandarin, several other trilliums, and two species of false hellebore, *Veratrum parviflorum* and *V. viride*.

This area was logged about the second decade of this century. At that time buckeye was not a profitable tree, so the buckeyes had freedom from oaks and hickories to grow their full height and breadth. In the fall, find your lucky buckeye, but do stay on the paths.

Under the same favorable conditions, yellow poplars also came in and grew rapidly. They, too, are extremely large now. In fact, it is said to be the best stand of second-growth yellow poplar in the United States.

What made this area so fertile? Back in the ice age, Georgia did not have glaciers, but did have enough cold to have a definite tree line. Now in Georgia on north aspect coves at 3,200 feet and above, there are boulder fields caused by freezing and thawing in rock crevices. Below this level are the colluvial fans formed from the rich dirt washed out of the boulder fields. This is where the wild flowers grow. A north aspect cove is cool and moisture is consistent, even in drought.

Ordinarily roads are not built on boulder fields, so Georgia Highway 180 skirts the boulders and leaves the colluvial fan for our enjoyment.

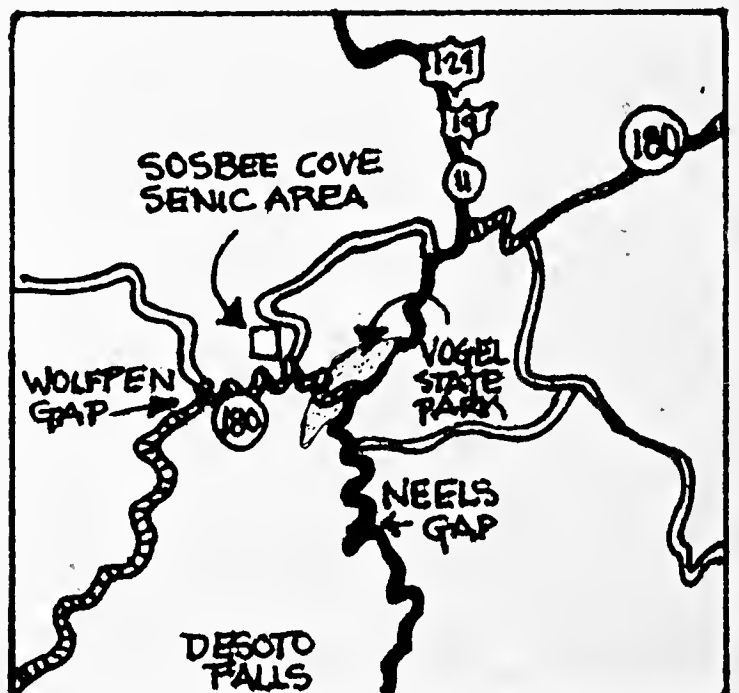


PATTY O'KEEFE HUTTON

Sosebee Cove Scenic Area is in the Chattahoochee National Forest between Vogel State Park and Wolfpen Gap. The 175-acre tract is set aside as a memorial to the late ranger Arthur Woody, who negotiated its purchase for the Forest Service.

Directions: Head north from Dahlonega or Cleveland toward Vogel State Park on U.S. Highway 19-129. Turn left onto Georgia Highway 180 West just after the entrance to Vogel. Continue about three miles on Georgia 180 until you come to the small parking area above the three signs describing the Scenic Area. The trails are below the road. In the Scenic Area they extend about a half mile.

We have former Georgia Botanical Society president Steve Bowling to thank for the botanical and geological description of Sosebee Cove.



PATTY O'KEEFE HUTTON

Tipularia

A BOTANICAL MAGAZINE

Published by the Georgia Botanical Society

May 1987



Margery Borom

Baptisia arachnifera Duncan

IN THIS
ISSUE

A hairy rarity/2
Cloning champions/26

What's in danger now?/16
They're ferntastic!/32

First Person Singular

The name game

By Bill Close

When you reach a mature age, two things happen: First, you lose your memory and, second, you...ah...I can't seem to remember the second. That seems to be the story of any botanizing for me.

My experience and training have been heavy in art and photography. I can work with the physiognomy of plants, but when it comes to remembering names and details—such as composite family, *Compositae*; genus, *Heterotheca*; species, *graminifolia*; common name, grass-leaved golden aster—I'm out.

Besides, there are so many names for the same flower. A certain orchid is known as the crippled crane-fly, the mottled crane-fly, or the elfin-spur—and that's only English. In Latin it's *Tipularia discolor* for the time being, but the same species has been named *Limodorum unifolium* or even *Orchis discolor* in the past. And it can be a whole new ball game when the seasons change and they are camouflaged.

I stand in tremendous awe, completely overwhelmed by the words and knowledge, disputed or not, that come from some minds. However, I enjoy being with wildflowers, although I tend to agree with Shakespeare's Juliet: "What's in a name? that which we call a rose / By any other name would smell as sweet."

This little fellow in his winter suit is known as *Obolaria virginica*, or pennywort, but I think surely he must be wort more 'n a penny.



Obolaria virginica, pennywort.

Nomenclature

By Adrienne Bond

Zephyranthes atamasco: commonly rock lily, rain lily, Easter lily

This is the month when spring fills up the flood plain of Big Lazar Creek, and we have come to name the inhabitants of its local earth. Next year a dam will stretch from where that poplar stands to where the ridge starts over on the other side; and then this hardwood bottom land will drown.

II

The path follows along the ridge but runs below it Indian-style. Climbing a wide circle through the woods we come out on the prow where creek and river merge and find rocks piled there, ruins already when the Muskogean came. They could have been observatories, tombs. What would they look like if we knew their names?

III

We sit together on the bridge and match our lists of Latin flower words. We watch the sunlight move along the creek. All this has drowned before. Below the stream another river runs in the dark in channels cut for it by ancient floods. The myth of it is ours; we know there is no memory in the rock of being silt, of the slow filter to the ocean floor.

IV

At dusk we climb through groves of blackened trees until we top an ashy hill and see a tide of atamasco lilies flood the woods. It is too late for picture-taking now; we are disarmed to seeing, stilled to wordlessness. Growing on slopes where underneath the soil continuous water seeps from the rock, these fragile flowers push up green and cool through what was burned and turn their steady blindness to the sun.

SPECIAL REPORTS

- 16 **A new look at endangered species** *By Thomas S. Patrick and Charles V. Rabolli.* The state takes inventory
Illustrated by Mozelle Funderburk
- 23 **Shortia: solving one mystery** *By Steven M. Jones*
Is it native to Georgia? *Illustrated by Lois Lovejoy*
-
- 2 **Doomsday looms in the pine barrens** *By Wayne R. Faircloth*
Baptisia arachnifera is dwindling *Illustrated by Margery Borom*
- 7 **The persistent botanist** *By Miriam Talmadge*
Wilbur Duncan stays busy in retirement
- 11 **Life and death in the bogs** *By Ann Barber*
Pitcher plants and other predators *Illustrated by Margery Borom*
- 14 **My pink-slippered gypsies** *By Beatrice Jefferson Stubbs*
These orchids are prone to wander *Illustrated by Bill Close*
- 26 **Cloning the champion** *By Treadwell Rice Crown III*
Mass production of an endangered species
- 28 **Showy, but not very sexy** *By Andrew C. Kemp*
Scutellaria montana in the Marshall Forest *Illustrated by Cecile Smith*
- 30 **Lamb's ears** *By Ruth E. Bell*
- 32 **Lloyd Snyder's ferns** *By Lloyd H. Snyder Jr. and James G. Bruce*
A new guide covers the state's pteridophytes
- 37 **One man's wilderness** *By Harold C. Jones*
At home on the Fall Line *Illustrated by Faith Birkhead*
-

First Person Singular

Inside front cover *Bill Close, Adrienne Bond*

40 *W. Brian Brown*

6 **Book Report** 31 **Addenda**

39 **Research Report** *Edited by Harriett L. Whipple*

40 **Byliners** Back cover **Site-seeing** *Elaine K. Fatora*

Front cover *Baptisia arachnifera*, the hairy rattleweed, is a plant that grows only in Georgia. Its discoverer, Wilbur H. Duncan, is a Georgian, as is Wayne R. Faircloth of Valdosta State College, who has devoted years to studying it. The plant, also known as hairy wild indigo, has hairy leaves and yellow, pea-like flowers that never fully open. Faircloth's report on this ghost of the pine barrens begins on page 2.

Board of editors Treadwell Rice Crown III, David L. Emory, Wayne R. Faircloth, Marie B. Mellinger, Harriett L. Whipple.

Executive editor Margaret Shannon

Business manager Sally Emory

Staff Anna Belle Close, Bill Close, Nancy Iha, Helen C. Stacey

Production Vasta Lucas, paste-up; Marion Peterson, printing adviser; Joe Sayers, mechanicals; Graphics, Etc., typesetting; William Acree Company, printing.

Tipularia is published at intervals by the Georgia Botanical Society to foster knowledge of and interest in the state's native plants and related subjects. Membership in the Society is open to all persons interested in the botany of Georgia. Annual dues: individual or family, \$12; group, \$20; student, \$5. Other membership categories: contributing, \$25; donor, \$100;

patron, \$1,000. Send mailing address and check made payable to the Georgia Botanical Society to: Adele Northrup, treasurer, P.O. Box 8882, Atlanta, Georgia 30306.

Members of the Society receive Tipularia without extra charge. Others may receive the magazine by becoming Tipularia associates for \$7 a year. To become an associate, send mailing address and check made payable to the Georgia Botanical Society to: Sally Emory, business manager, Tipularia, 7575 Rico Road, Palmetto, Georgia 30268. Single copies are available in limited quantities from the same address for \$4 each.

Copyright 1987 by the Georgia Botanical Society. Postage paid at Duluth, Georgia. Send address changes to: Sally Emory, business manager, Tipularia, 7575 Rico Road, Palmetto, Georgia 30268.

For reasons not fully known, the few populations left of the rare hairy rattleweed continue to dwindle

Doomsday looms in the pine barrens

By Wayne R. Faircloth

Illustrated by Margery Borom

Early naturalists who visited the pine-barren areas of the southeastern coastal plain were not overly impressed. William Bartram's observations were typical. Describing "some remarkable barren plains" near Manatee Springs in present-day Levy County, Florida, he wrote: "...I was struck with astonishment at their dreary appearance...pine trees...with clumps of mean shrubs, which served only to perpetuate the persecuting power and rage of fire."

Not a likely place, one would think, for anything of unusual botanical interest to occur. But the pine barrens of Georgia's Lower Coastal Plain provide the habitat for one of this state's—and this country's—rarer plants: the hairy rattleweed, *Baptisia arachnifera* Duncan. It is under both state and federal protection as an endangered species, and it has been found nowhere in the United States except Wayne and Brantley Counties in southeast Georgia.

The hairy rattleweed, or hairy wild indigo, was described in 1944 by Wilbur H. Duncan of the University of Georgia. He first collected it near Jesup in the summer of 1942, and suspected it was distinct from *Baptisia perfoliata* and *B. simplicifolia*, other unifoliate species that occur in the coastal plains of Georgia and Florida.

Dr. Duncan's original collections

were lost, but others made on July 4, 1943, confirmed his suspicion and provided the type material for the new species. He described the type locality as "sandy soil in open pine woods, 10 miles south of Jesup, Wayne County, Georgia." He and other botanists have since recorded additional locations in Wayne County and in Brantley, the adjoining county to the south.

Except for its silvery, gray-green color that makes it stand out among other vegetation in the pinelands, little else about the hairy rattleweed would cause it to claim more than passing attention. It is a perennial herb with a stout, much-branched stem that grows to a height of 2-2.5 feet. The ascending branches rise alternately from the primary stem, and a single older rootstock may produce up to five primary stems.

The leaves are simple, weakly heart-shaped, leathery in texture, and alternately arranged on the stem. Both the stems and the leaves are covered with a dense mat of cobwebby (arachnose) gray-white hairs—the character on which the plant's epithet name *arachnifera* is based.

The hairy rattleweed has yellow, pea-shaped flowers spirally arranged in terminal, spike-like racemes 3-5 inches long. The fruit is a hard, oval-shaped,

Baptisia arachnifera,
hairy rattleweed.

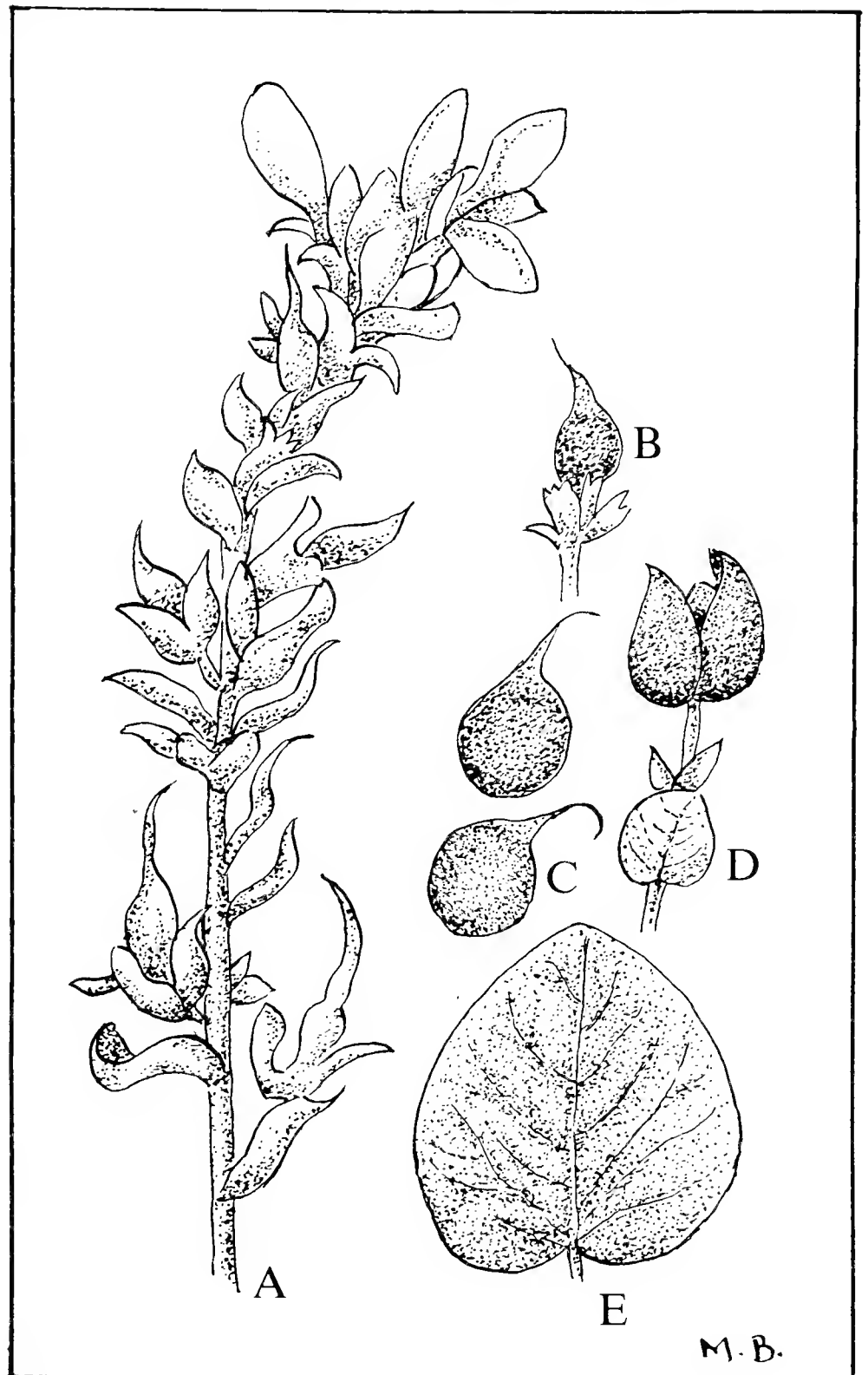
A. Spicate raceme
inflorescence.

B. Immature legume.

C. Mature legume.

D. Dehiscent legume.

E. Leaf, showing primary
venation.



hairy legume with a short beak at the upper end and 6 or 7 ovules (seeds) per pod. A large, woody underground rootstock maintains the plant's perennial habit.

Although the range of *B. arachnifera* covers approximately 125 square miles, the plant's distribution within the range is restricted. The range lies entirely within the Lower Coastal Plain Province of Georgia, a region characterized by poor drainage, with vast swamps, open marshes, and numerous ponds.

Here and there in the poorly drained areas are sandy, broad terraces that are slightly higher in elevation and better drained. They are known locally as flatwoods, and this is where the hairy rattleweed grows.

The flatwood terraces have two separate, but contiguous habitats. The more extensive one is slightly lower than the other and has an organic hardpan 18-24 inches below the surface. The moisture level ranges from near-saturation in early spring to dry by late summer and fall.

The tree overstory here is almost exclusively slash pine (*Pinus elliottii*) and pond pine (*P. serotina*). Undergrowth consists of a distinctive shrub zone composed of saw palmetto (*Serenoa repens*), gallberry (*Ilex glabra*), poor-grub (*Lyonia ferruginea*), blueberries (*Vaccinium* species), gopherberries (*Gaylussacia* species), wicky (*Kalmia hirsuta*), and wax myrtle (*Myrica cerifera*). The most thriving populations

of the hairy rattleweed are on sites where the competition of shrubs has been eliminated.

Higher elevations on the terraces are considerably less extensive. The coarse, sandy soils generally lack the organic hardpan, or it is very deep—as much as 4.5 feet below the surface. Therefore, the soil moisture level is low all year.

These sandy ridges are dominated by *Pinus palustris*, the longleaf pine, with an occasional admixture of longleaf and slash pines. There are always a few scattered scrub oaks: *Quercus laevis*, *Q. chapmanii*, *Q. margaretta*, *Q. marilandica*, and *Q. geminata*. Except for widely separated clumps of saw palmetto, the conspicuous woody shrub zone is absent from these drier sites.

The hairy rattleweed can be found in the ecotone (transition zone) between the drier and wetter phases of the flatwood habitats, but there is no doubt that it thrives best in the wetter phase. *B. arachnifera* seems to require the seasonally high water table within its root system.

Dr. Duncan noticed a steady decline in the number of individual plants over a 30-year period, and other botanists were able to corroborate his observations, even though no statistical evidence was produced to document this trend.

When Georgia's list of plants to be given protected status was compiled in the mid-1970s, *Baptisia arachnifera* was one of the first unanimously agreed upon as threatened with extinction. In 1978, it was one of eleven plants nationwide approved for the federal list of endangered species. It has received considerably more attention since it came under state and federal protection.

Although the plant's range appears not to have decreased appreciably since its discovery, the number and size of its populations continue to dwindle.

Two factors have been identified as playing significant roles in this diminution: (1) the drastic reduction in the number and frequency of fires in the

flatwoods and (2) the modern practices associated with timber harvesting and reforestation of the pinelands.

The vegetation of the pine flatwoods represents a fire subclimax community. Reoccurring fires and soils of low fertility eliminate a distinctive shrub zone from the forest and maintain widely spaced trees, mostly pines. The hairy rattleweed requires these open conditions; it does not survive the competition and shading produced by shrubs and trees present when fire is excluded.

Indians and early settlers used fire extensively to maintain a herbaceous ground cover in the flatwoods for grazing their cattle. But by the early part of this century, foresters were actively advocating the practice of no burning as the major factor in forest management. Only recently has there been a reversal of this.

Perhaps the greatest factor in the decline in hairy rattleweed populations is clear-cutting of the overstory pines for lumber and pulp, followed by clearing and replanting the sites.

There is evidence that the plant is capable of surviving the cutting practices, but subsequent methods of site preparation, particularly chopping and bedding with heavy machinery prior to pine replanting, are too drastic to maintain healthy populations. In such areas, once-thriving populations are now reduced to a few plants surviving along access roads, highway rights-of-way, or other less disturbed sites.

Large forest products companies own most of the land within the hairy rattleweed's range. Unless they modify their reforestation practices to protect *B. arachnifera* sites, the range, number, and density of its populations will continue to diminish.

A few plants do manage to persist in reforested pine plantations, probably from root sprouts. There are now several such depauperate stands that could probably be restored to a vigorous condition if the sites were thinned selectively and burned at suitable intervals.

It is encouraging that Rayonier Corporation and Brunswick Pulp and Land Corporation, the two major landowners in the hairy rattleweed range, are cooperating in establishing experimental plots to test the accuracy of these findings and to ascertain how they can best modify their forestry practices to promote hairy rattleweed growth without losing the use of their land.

One must not assume that fire and forestry practices are the only reasons why *B. arachnifera* is rare. Why, for example, is it endemic only to portions of two counties in Georgia when there are thousands of acres of habitat in the coastal plain that are physiognomically indistinguishable from the sites where it grows?

This, and other equally significant questions, must be answered before botanists can deal meaningfully with the plant. Any realistic approach to protecting an endangered species from extinction must be founded on an understanding of its total biology, including the climatic, edaphic, and biotic interrelationships that make it a unique organism.

I have been studying the hairy rattleweed for more than four years and am convinced that some of the secrets of the plant's rarity are hidden in factors still under investigation.

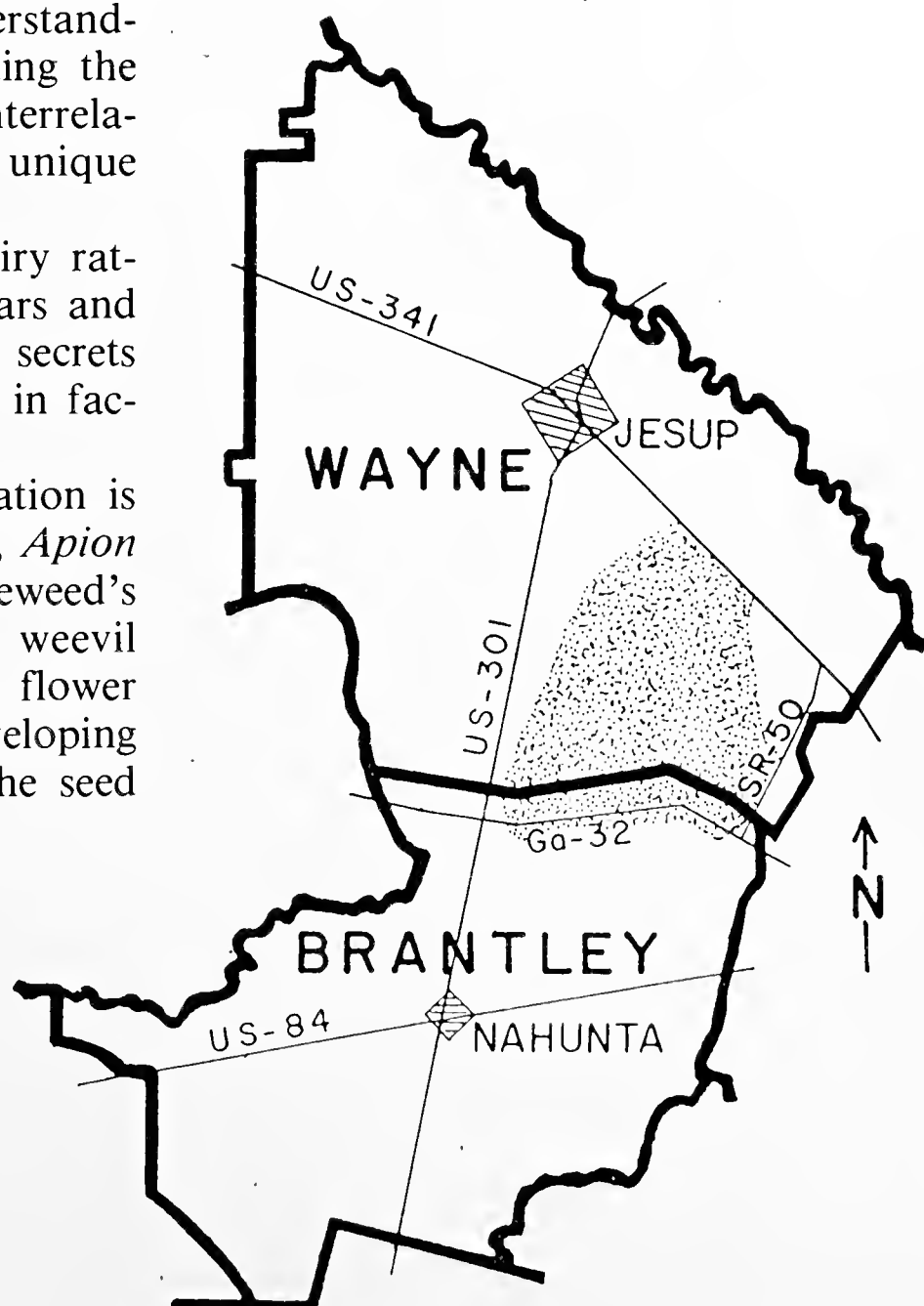
One needing careful examination is the relationship of Say's weevil, *Apion rostrum*, and the hairy rattleweed's reproductive capacity. The weevil deposits its eggs in the young flower buds. The larvae feed on the developing ovules (seeds) and pupate in the seed

Pods. Then the adults emerge through little round holes they cut in the legume wall. As much as 35 percent of the potential seed crop per year may be destroyed by the weevil.

Say's weevil also may be the plant's chief pollinator. If this relationship is established, then managing the hairy rattleweed also will mean managing Say's weevil. So far, only one other insect, a species of *Contarinia* known only from the larval stage, has been found that may be involved in the plant's pollination.

The correlation between the hairy rattleweed and spodic soils also needs defining. These soils are characterized by a subsurface hardpan—a complex of fine sand, organic matter, and iron, cemented together. The hardpan impedes the vertical movement of water and air through the soils and is responsi-

Range of the hairy rattleweed is indicated by the stippled area.



ble for the high water table that occurs in winter and early spring.

Similar soils are widely distributed over large portions of the coastal plain. So why is the hairy rattleweed restricted only to Wayne and Brantley Counties? Is the limiting factor of these soils merely a function of the moisture regime, or does it also involve a nutrient component? Macronutrient differences have been ruled out; investigations are underway to determine if any micronutrient factors are involved in its endemism.

Other common limiting factors can be fairly well ruled out. The plant seems relatively free of disease, it is not the target of predators, and it appears to produce an adequate supply of seeds. What, then, are the causes of the meager number and restricted range of *Baptisia arachnifera*?

The answers seem to be habitat restrictions, and these relate, in turn, to the origin of the species. Deducing the origin will generate another batch of equally important taxonomic questions.

No one can say whether the hairy rattleweed already was a failing species when the Indians and early settlers began to utilize its range, dooming it to extinction, or whether it had stabilized in its habitat. But it is now clearly an endangered part of our botanical heritage, valuable for the ecological and taxonomic lessons it exemplifies, for the many unanswered questions it poses, and, like any endangered species, for the legal and moral responsibility it teaches us.

LIST OF REFERENCES

William Bartram. 1791. Travels through North & South Carolina, Georgia, East & West Florida. Naturalist's edition, edited by Francis Harper, 1958. Yale University Press.

Wilbur H. Duncan. 1944. A new species of *Baptisia*. *Rhodora* 46:29-31.

Wayne R. Faircloth. 1984. Hairy rattleweed (*Baptisia arachnifera* Dun.) recovery plan. U.S. Department of the Interior, Fish and Wildlife Service, Atlanta.

U.S. Department of the Interior, Fish and Wildlife Service. 1978. Determination that 11 plant taxa are endangered species and 2 plant taxa are threatened species. Federal Register 43:17910-17916, April 26, 1978.

Book Report

Views From Valley Front by Beatrice Jefferson Stubbs, John F. Blair, Publisher, 1406 Plaza Drive, Winston-Salem, North Carolina 27103. \$6.95.

Our own Bot Soc member, Beatrice Jefferson Stubbs, who lives near Dillard, Georgia, has written a most delightful book. Subjects range from Cherokee lore to bread-baking to energy, and all express Bea's own inestimable philosophy and love of the mountains.

Of special interest, and must reading for all botanists, is the chapter on summer wildflowers. In this she extols the abundance of our wild, sun-loving flowers and their adaptations to roadsides and gardens. Especially entrancing is her account of an interview with a local highway officer on the subject of gathering roadside flowers.

And an intriguing postscript: Her autograph party at a local bank featured a very large and very delightful bouquet of fall wildflowers. — *Marie B. Mellinger*.

Azaleas by Fred C. Galle. With 366 color photos and 32 black-and-white illustrations. 600 pages. Timber Press. \$65.

As the sheer size of this volume indicates, Mr. Galle has assembled an encyclopedic work on that mainstay of southern gardens, the azalea. It is, quite easily, the most comprehensive reference book on the subject presently available to scientist, horticulturist, and gardener.

Fred Galle is well-qualified to author such a tome, coming to the project with over 40 years of professional experience with the genus *Rhododendron*.

"Azaleas" is an enjoyable reflection of Galle's personality. It is structured to answer most questions about azaleas, whether they concern identification, history, nomenclature, culture, or pests.

Galle documents the important role that North American species have played in developing the showy deciduous hybrids available today. He also notes the work being done to offer selected forms of the natives as a response to the increasing interest in and use of native plants by the gardening public.

The book is already in its second printing. The few minor flaws found in the first edition have been corrected.—*Treadwell Rice Crown III*.

The persistent botanist

Wilbur Duncan, discoverer of three rare species, isn't resting on his laurels (or his trillium, either)

By Miriam Talmadge

Wilbur Duncan lives in Athens, Georgia, in a house on the edge of the woods, with great windows that open out onto his garden, his trees, and his flowers, the plants which have been his main interest, his obsession, for most of his life. When you enter a room of his home to talk to him, he jumps up and immediately starts pointing out his favorite trees.

Now retired, this botanist can look back on a very distinguished career. He taught at the University of Georgia from 1938 to 1978 and was in charge of the university's herbarium for 38 years during that span of time. Some of his former students have become promi-

nent in botany and related fields, and he has written prodigiously, and is still writing, on botanical subjects.

Duncan also is one of that special company of botanists whose names are attached to the scientific names of plants as their discoverers in a scientific sense—that is, the first to determine that a species is new and to publish a description of it.

He has the even rarer distinction among living American botanists of being the discoverer of three of the rarest species in the United States.

Duncan discovered and named *Baptisia arachnifera*, the hairy rattleweed, and *Trillium persistens*, the persistent trillium, two of the first plants placed on the federal list of endangered species. He also discovered the Oglethorpe Oak, *Quercus oglethorpensis*, the first oak described east of the Mississippi River in 90 years. The trillium was even featured on a commemorative postage stamp in 1979.

There is spirited competition among botanists, and nowhere is it more evident than in the race to publish the first description of a new species. As a matter of fact, Duncan and another botanist battled over the persistent trillium, with Duncan, obviously, carrying the day.

The trillium actually was brought to Duncan's attention by John Garst, a



Trillium persistens,
persistent trillium.

Drawing by Bill Close

The day Edna found her trillium

By John Garst

My family—my wife Edna, John, Jr., Jennifer, and I—were hiking and picknicking in the northeast Georgia mountains one day in March 1970. Edna was the first to see a flowering plant. Her question, “Did you see that trillium back there?” led to my remark, “That’s the funniest-looking Catesby’s trillium I’ve seen.”

When I found a colony of plants freshly in bloom a half-hour later, I realized that the first was not a freak and that it wasn’t Catesby’s trillium (*Trillium catesbaei*) at all. I thought it might be the common white erect trillium (*T. erectum*), which I had never seen.

Two weeks later, my friend George Neece, an avid wildflower enthusiast, took me to see the white erect trillium, and I realized instantly that Edna’s trillium was different, very different. We made an eight-mile trip in the rain in an open boat to collect some specimens that day.

We took them to George’s friend, and now mine, Wilbur Duncan, professor of botany and curator of the University of Georgia herbarium. He didn’t know the species, either, and we all thought that investigations were in order.

One day Wilbur pulled out of his “problem specimens” file a dried trillium that he had collected in 1950 at a location not far from ours. Although Wilbur had regarded it as “not quite right” for Catesby’s trillium, two trillium experts had so iden-

tified it. A visit the next March to the location of the 1950 specimen revealed flowering plants that were not Catesby’s trillium, but Edna’s trillium.

Wilbur became convinced it was a new species, and a description was written and published in 1971. Because the plant comes up earlier than most trilliums and stays green later into the fall, the Latin word for “persistent” was chosen as the epithet, and it became *Trillium persistens*.

Edna’s trillium is a dwarf; some flowering plants are only 2 inches high and the average is 5 to 7 inches, small compared to most trilliums with flowers on stems. It really isn’t a beautiful plant, but it has character. It is scrawny, but vigorous. It looks fragile, but it withstands whipping March winds that leave its parts shredded, but still alive and growing.

The plant has relatively narrow, acutely pointed leaves; flowers that open less fully than those of other trilliums, retaining more of a bell shape; and exceptionally long and slender flower stalks. An unusual habit is that freshly open flowers rest on leaves, rising above them with aging. Aging brings a color change, the tips of the flowers becoming streaked with reddish-violet.

On the postage stamp (issued in 1979), it is called “The Persistent Trillium.” To our family and all our friends, it has always been Edna’s trillium.—*From the Athens (Georgia) Banner-Herald, June 3, 1979.*

professor of chemistry at the University of Georgia. Garst and his family, amateur botanists, had come upon it in the northeast Georgia mountains in 1970, thought at first it was a Catesby’s trillium, and then decided it might not be. (See Garst’s account on this page.) A mutual friend took Garst to see Duncan, who subsequently identified the trillium as a new species.

Later, on a visit to the Vanderbilt University herbarium, Duncan learned that a Vanderbilt professor had become aware of the new trillium at about the same time the Garsts and Duncan had. He and Duncan discussed the matter,

but Duncan was first in print with the new trillium in 1971.

Wilbur Howard Duncan was born in Buffalo, New York, in 1910. When he was 2 years old, his family moved to Indiana, where he was raised. In his junior year at Indiana University, he shifted his major from horticulture to botany.

Duncan considers Paul Weatherwax to have been one of his best teachers at Indiana. He also got a tremendous boost from working there under Stanley A. Cain, a noted plant geographer, while studying for his Master of Arts degree. At Duke University, where he went on a fellowship, he studied for his



Wilbur Duncan.

Drawing by Scarlett B. Rickenbaker

Ph.D. under C. F. Korstian, a top man in forest ecology.

He believes he was fortunate to have had such distinguished professors, and his advice to students is to find the *person* whom they want to study under, at whatever university he or she may be. That is why he went to Duke. Even though it was not then considered a great university, he wanted to study under Korstian.

Very early in his career, in the summers of 1934 to 1937, Duncan worked as a naturalist for the Indiana Department of Conservation. He says this experience had a great influence on his later life because it taught him to communicate with people. It was also a job that paid well and gave him money to go on to graduate school.

Duncan's teaching career at the University of Georgia began when he was 28. Early on, he took charge of the university's herbarium, which then had

only 16,000 specimens. It was to become a major undertaking for him.

Duncan was convinced that any state needed a first-rate herbarium—and Georgia did not have one. For this reason, he spent much of the time in the ensuing years improving the university herbarium—time which, he believes, he could have spent on research more profitable to furthering his career.

Duncan collected diligently and so did his students, colleagues, and many others whom he spurred on. When he retired in 1978, the herbarium had 134,000 specimens. Not only are they used there, but the herbarium also lends many specimens to other universities and in turn borrows from them.

Among his students through the years who have distinguished themselves in academe are Philip Greear, retired head of the Department of Biology and Earth Science at Shorter College in Rome, Georgia; Wayne R. Faircloth, head of

the Department of Biology at Valdosta State College; Willy Gunn, president of Emanuel County Junior College, Swainsboro; Samuel B. Jones, Jr., professor of botany and present director of the herbarium at the University of Georgia; and Wesley Walraven, dean of Floyd County Junior College, Rome.

Duncan's description of the Oglethorpe oak was published in 1940. His "Guide to Georgia Trees" was published the next year. Then, from 1941 to 1946, he interrupted his career at Georgia for wartime duty with the U.S. Public Health Service, working on mosquito control. Publication of his discovery of *Baptisia arachnifera*, the hairy rattleweed, occurred during that period (in 1944).

Dr. Duncan's published works include "Poisonous Plants of Georgia," 1949; "Woody Vines of the Southeastern United States," with Thomas Jones, 1975; and "Wildflowers of the Southeastern United States," with naturalist/photographer Leonard E. Foote, 1975, as well as uncounted numbers of papers for scientific journals.

With retirement, Duncan is still at it. This year, the Smithsonian Institute published "Seaside Plants," a field manual, which he coauthored with his wife, Marian B. Duncan. It was eight years in the writing and he considers it perhaps their best work.

"Seaside Plants" covers habitats under the influence of the sea from Louisiana to northern Florida and up to Massachusetts, because the last of the true barrier islands is off its coast.

The book includes plants of beaches, dunes, maritime forests, islands, and salt marshes. It is diagnostic, containing descriptions which classify species precisely, and this is unique among field manuals. It is also extremely comprehensive, with 594 color photographs of 588 species, some black-and-white plates, and more than 100 drawings.

The Duncans traveled 60,000 miles by boat, plane, car, and on foot, down

many a dusty road, to get their material. "We worked our heads off writing that book," Duncan said. It was great fun.

A botanist often has to work a lot harder to collect material than you might imagine from reading the neatly published results. It can even be hazardous. A favorite story told about Wilbur Duncan goes back to a time when he was asked to make a herbarium collection for the Youth Museum of Savannah.

Tramping around in the marshes by himself looking for specimens, he was suddenly confronted by a furious female wild hog fiercely defending her brood of piglets. Duncan (so the story goes) was forced to scramble up a tree and stay there until some people happened by and rescued him.

The University of Georgia Press will soon publish "Trees of the Southeast," another husband-wife collaboration of the Duncans. They have chosen an arbitrary size limit to eliminate shrubs, and the book will contain all species with one or more plants that have reached tree size. It, too, will be diagnostic, and there will be dot distribution maps for most species.

Duncan is proud of his family. His wife, Marian, who is from Jesup, Georgia, was in graduate school at the University of Georgia when they were married in 1941. They have enjoyed working together, and he says that she has been an invaluable help, both editorially and psychologically, and that he could not have made it without her. The Duncans have two sons who are geologists working in oil exploration and a daughter who is senior lawyer with a software computer firm.

The list of organizations Duncan belongs to is very long. He has been president of the University of Georgia chapters of Sigma Xi and Phi Kappa Phi and of the Georgia Academy of Science and the Southern Appalachian Botanical Club.

Life and death in the bogs

*Where the pitchers
and other plants prey*

By Ann Barber

*Illustrated by
Margery Borom*

The sunny, wet savannas of Georgia's Coastal Plain are among the most colorful and bountiful wildflower habitats in the state. The pageant of bloom begins in late winter with the daisylike *Chaptalia*, the sun-bonnets, and continues well into the fall when several species of *Liatris*, the blazing stars, round out the flowering season.

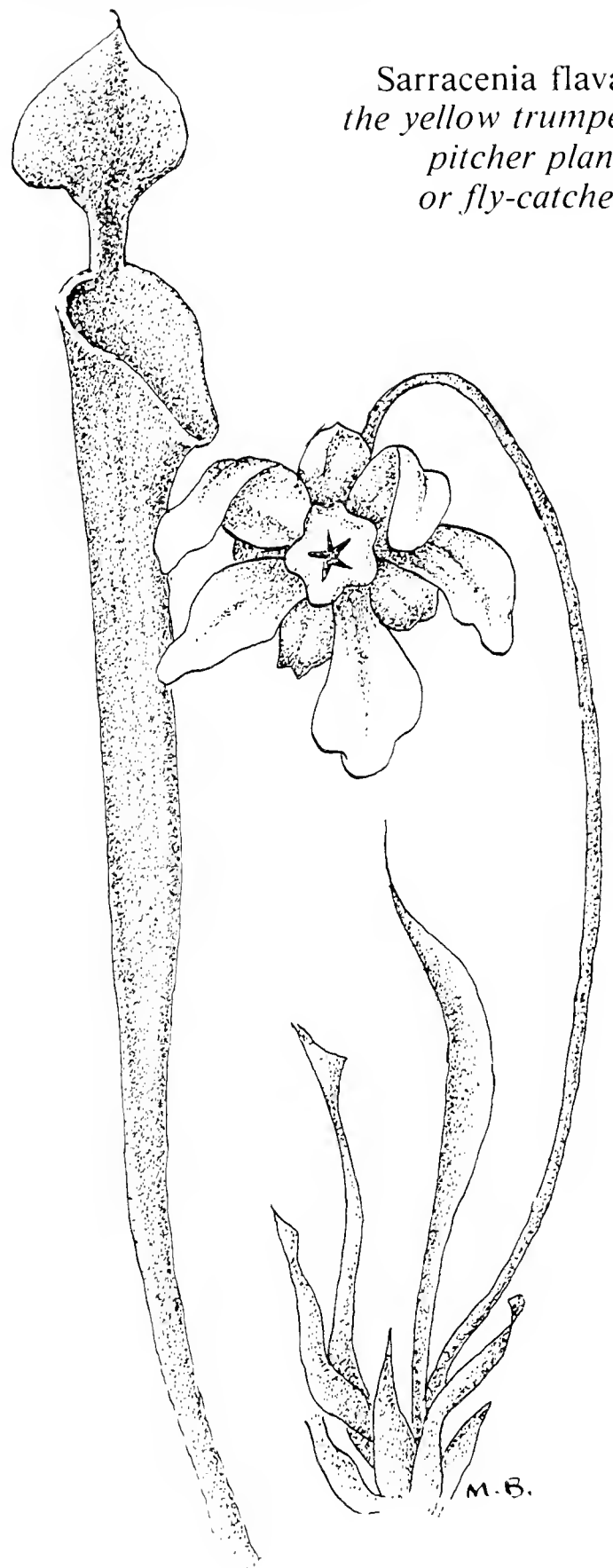
For much of the year, the most conspicuous plants are the insectivorous *Sarracenias*, which give these areas their popular designation as pitcher plant bogs.

Many of these bogs are found within the physiographic region of south Georgia called the Tifton Upland. Geologist-botanist Roland Harper (1878-1966) referred to the same region as the Altamaha Grit and described it later even more aptly as the "Rolling Wire-grass Country."

The term "Upland" is relative. The region is higher than the Dougherty Plain to the west and the Coastal Terraces to the east, but it might be difficult for a resident of the mountains to see it as upland. It is characterized by rolling terrain with broad ridges and gentle slopes dissected by many small streams.

The Tifton Upland was originally a

Sarracenia flava,
the yellow trumpet
pitcher plant,
or fly-catcher.



part of the extensive long-leaf pine forest of the southern Coastal Plain. Today it is primarily agricultural and much of the pine found there now was planted for harvesting as pulpwood and timber.

The pitcher plant bogs are located in low swales, or depressions, within the Upland pine forest. They are sandy areas, flat or slightly sloping, with strongly acid soil kept moist by lateral seepage.

Healthy bogs have few trees or shrubs, but a change in moisture or an

absence of fire for several years will encourage the rapid growth of such woody plants as *Magnolia virginiana* (sweet bay) and *Myrica* (wax myrtle) species.

If the condition continues for a long time, the herb bog becomes a shrub bog and the great display of *Sarracenias* diminishes and finally disappears.

Three species of *Sarracenia* commonly share these bog areas. The largest, and first to flower, is *S. flava* Linnaeus, the yellow trumpet, locally called the fly-catcher. Its blossoms—and those of the other two species—emerge ahead of the new leaves, usually appearing around mid-March. Petals and sepals are bright yellow. The leaves that come along later are hollow—like pitchers.

Sarracenia minor Walter, the hooded pitcher plant, flowers about two weeks later than *S. flava*. Its yellow blossoms are similar to the yellow trumpet's, but smaller.

The third species, *S. psittacina* Michaux, the parrot pitcher plant, begins to flower about the same time. Since the older pitchers lie flat on the ground and are often hidden by taller grasses and sedges, the plants may go unnoticed until their bright red flowers appear.

The richness of the *Sarracenia* display is enhanced by their tendency to hybridize freely, often with quite handsome results. The hybrids provide an interesting taxonomic challenge; even experienced botanists may puzzle over the complex parentage of some specimens.

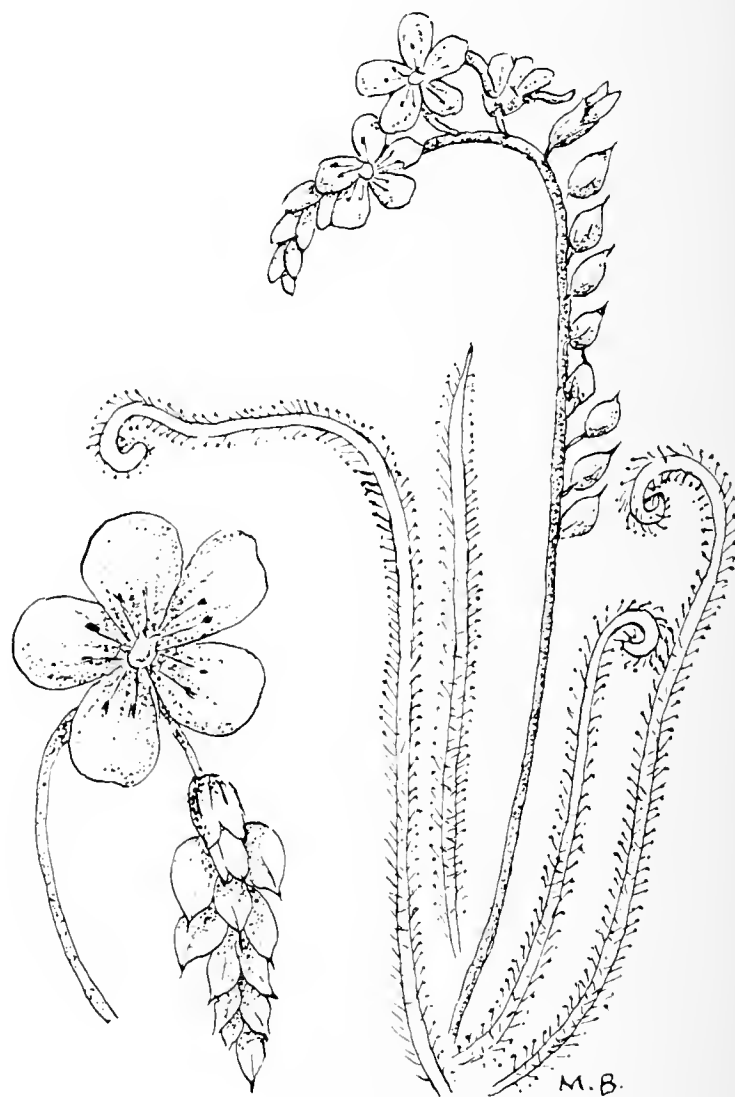
Although usually not so numerous or so overtly spectacular, several other species of carnivorous plants may be found in and around the bogs. Among them are two butterworts, *Pinguicula caerulea* Walter and *P. lutea* Walter. Since their leaves grow in a basal rosette flat on the ground, they can be hard to find when not flowering.

There are insect-catching sundews (*Drosera*) in the bogs, too. But it takes a close search to find most species because their leaves also grow in a basal

rosette and their flowers are small.

With erect leaves and large pink blossoms, *Drosera filiformis* var. *tracyi* (Macfarlane) Diels, the threadleaf sundew is a notable exception. A stand of these with the morning light shining through their "dewey" leaves is an unforgettable sight.

Another unforgettable sight is a stand of *Utricularia cornuta* Michaux, one of the bladderworts, growing on the margins of a pond. Each golden



Drosera filiformis, threadleaf sundew.

blossom, with a tiny spur or horn at its base, rises out of the water on a naked scape.

The bladderworts are unlikely-looking carnivores. A second species, *U. subulata* L., which grows within the bogs themselves, is so small that it is often overlooked.

Trapping mechanisms among the carnivorous plants are commonly divided into two types: active and passive. In these bogs of the Tifton Upland, only *Utricularia* belongs to the active category. It snares prey in a submerged

bladder-trap that opens when its sensitive trigger hairs are touched by an unwary mosquito larva, a protozoan, or some other small aquatic animal.

Sarracenia has a passive trap of the "pitfall" type. Insects are lured to the pitcher by a sweet substance and, once they have entered, fall in and are unable to escape. The plant then digests them for nourishment, especially nitrogen.

Drosera and *Pinguicula* have traps of the "flypaper" type. Sticky glands on the surface of their leaves attract insects and subsequently ensnare them for the plants to digest.

There are slight differences between the sundews and the butterworts in what happens after the prey becomes stuck. In *Drosera*, the stalked glands slowly bend over the victim and help to hold it securely. In *Pinguicula*, the leaf margins curl over the prey during digestion.

The carnivorous plants catch the fancy of the public, but there is other value to the pitcher plant bogs. Because they are so floristically and ecologically diverse, these areas are admirably suited for use as outdoor laboratories. In fact, several colleges and universities regularly send classes to the bogs for field work.

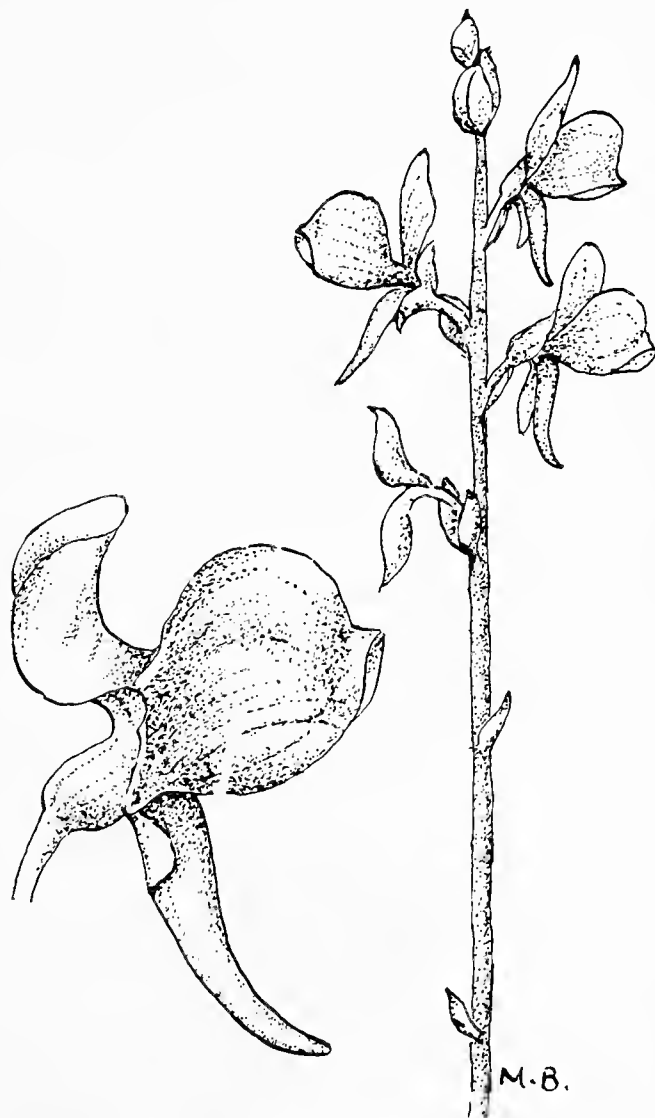
So far, however, few elementary or secondary schools in the area take advantage of the bogs' proximity and interesting character. One teacher who does is Mrs. Carol Pickens, whose pupils are sixth and seventh graders in a science program for gifted students in Colquitt County.

Each spring, she teaches a course that begins with a slide show on bog plants. Then comes a field trip that is truly a hands-on, feet-wet experience. In the concluding phase, students prepare and make a presentation on the subject at their home schools.

The advantage of teaching introductory botany in this setting, rather than in a flower garden or conventional classroom, lies in the instant fascination that these plants offer. The fact that they "eat" insects both surprises and in-

trigues students and starts them off in the plant world with great interest and enthusiasm.

If each local school system would locate and attempt to preserve a bog for this purpose, there would be an additional benefit. It would aid in the



Utricularia cornuta, a bladderwort.

ultimate preservation of these wonderfully useful bogs.

Indeed, it is going to take any number of schemes to preserve the pitcher plant bogs. Land-use trends in this intensely agricultural part of Georgia do not bode well for them. Drained for growing pine trees and row crops, flooded for fish ponds, bisected for highway systems, and filled in for subdivisions, they are an endangered ecosystem.

LIST OF REFERENCES

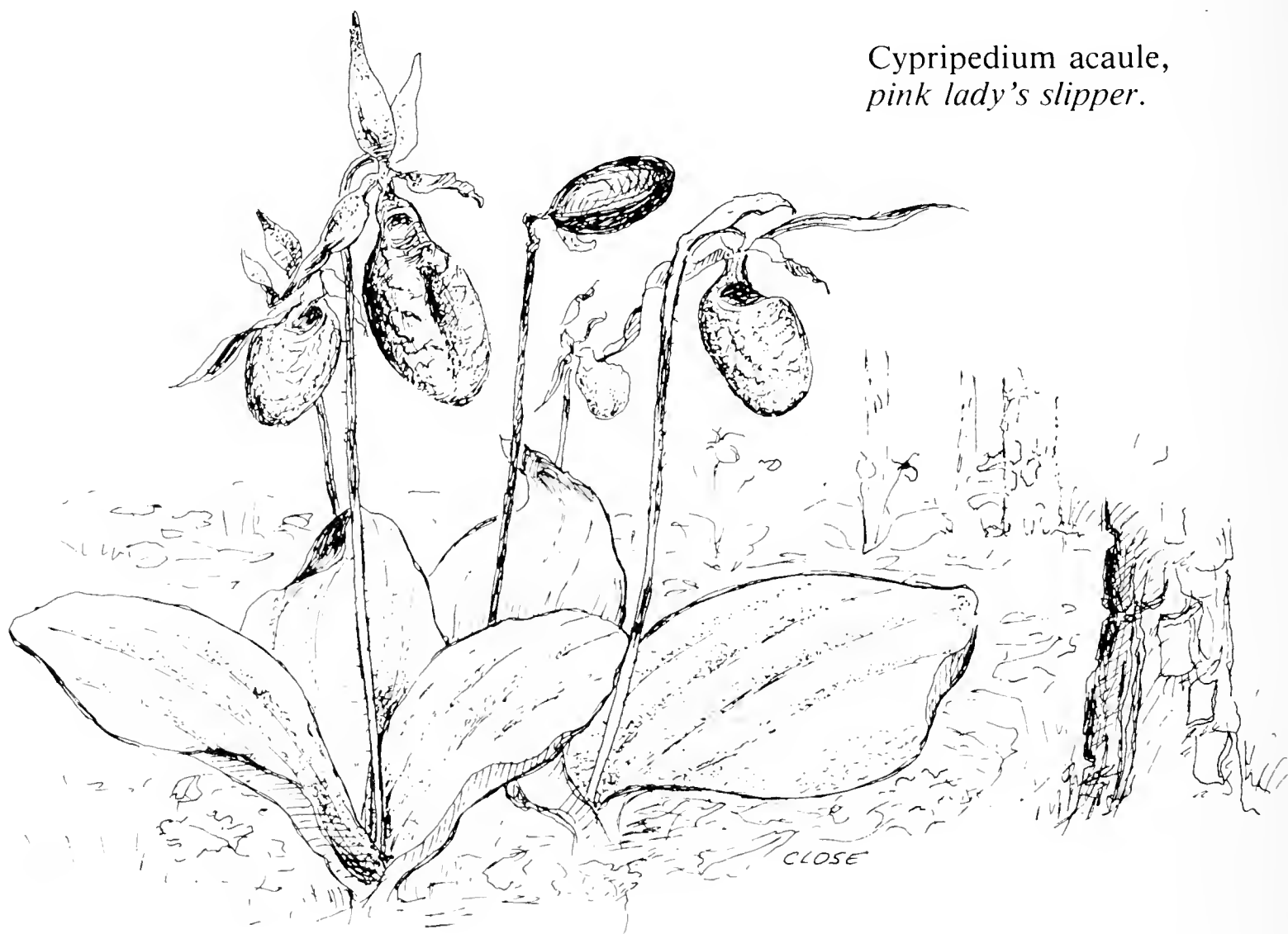
- George W. Folkerts. 1982. The Gulf Coast pitcher plant bogs. *American Scientist* 70(3):262-267.
- Roland M. Harper. 1922-1923. Development of agriculture in Georgia from 1850-1920. Reprinted for the author, University Publications Office, Alabama. (Also: *Georgia Historical Quarterly* 6:3-27, 97-121, 211-232, 323-354.)

My pink-slippered gypsies

By Beatrice Jefferson Stubbs

Illustrated by Bill Close

Cypripedium acaule,
pink lady's slipper.



‘Views from Valley Front’

“Toward the end of August, when dogwoods and sumac herald the approach of autumn with their bright red and yellow leaves, there begins a spectacular show by the composites — the category of plants considered to have reached the highest level in plant evolution. This group includes the brilliantly yellow sunflowers, all the blue and white asters, the various goldenrods, white boneset, and many others. Their flowers grow in clusters, arranged for mutual benefit, and each has developed its own mechanism to attract insects to ensure pollination. Their seeds are said to ‘ride, cling, and float.’ Ragweed seeds, for instance, are spread by the wind. Some seeds stick to the coats of animals, and some are disseminated by birds. The number of seeds

from composites alone would tax the largest computer.

“I was driving down the lane in late September with a friend who pointed to a tall stalk with yellow flowers like a candelabrum and asked its name. I did not know whether she was testing my knowledge or merely asking a question in the manner of children, who do not necessarily want an answer but are showing their awareness. If I had told her it was yellow wingstem (*Verbesina occidentalis*), she would have accused me of showing off and would most likely have forgotten the name anyway, so I played it safe and answered, ‘Just one of those composites.’ ”
—From “Views From Valley Front” by Beatrice Jefferson Stubbs.

There's an old-timey way of describing a devious, unpredictable person: "You can't put your finger on him." That's the pink lady's slipper. They don't stay put. They're maddening.

Like the Irishman's flea, they seem to hop around en masse—perhaps not as fast as the flea, but they change locations every few years. They can't be counted on.

Certainly one of the loveliest of spring wildflowers, *Cypripedium acaule* is as temperamental as it is beautiful. The magenta-pink blossom is suggestive in shape of an Indian moccasin. This has given this species of lady's slipper the common name of moccasin flower.

It is a handsome plant. Two large, ribbed leaves, slightly downy, coming directly from the fleshy root without a stem, form a complimentary receptacle for the exquisite flower, which attracts honeybees and bumblebees to insure pollination.

When the flower dies, a sharp-pointed seed pod remains, containing infinitesimal seeds which are scattered mainly by the wind. These seeds are slow to germinate and are distinctly choosy as to their habitat. (A real estate salesman would find them hard clients to please.)

Over a long period of time I have watched the migrations of hosts of lady's slippers—first on property in Scaly Mountain, North Carolina, where several hundred covered an isolated hillside, only to disappear gradually over the next three years. They were then spotted about a half mile away.

The few plants I brought from that first hillside bloomed near my garden in Dillard, Georgia, for two years, then disappeared. (I put that down to moles and mice.) But six years later I was surprised by several plants in the woods behind my house, a long distance from the originals.

When we don't have a scientific explanation, we are apt to endow things with personal traits, as I have done in calling these plants gypsies, but, in truth, they are following definite natural laws.

My questions were answered, as usual, by naturalist Marie Mellinger, who said that it has to do with a symbiotic relationship between the orchid and a fungus and between the fungus and a conifer, in this case the pine.

This would mean that seeds of the lady's slipper would not germinate and grow without the fungus present and that the fungus may not be present unless the pine is. (This is not exactly a "Design for Living" like a human triangle; I doubt if the pine is dependent on either the flower or the fungus.)

When I had to have some pines cut behind my house, there were still lady's slippers there the second year afterward, and I noticed that large stands of the plants had moved beyond my property line unmolested. It will be interesting to watch what they decide to do: whether there still will be enough of the fungus left on my property to suit them or whether they will pay me back and desert me entirely because I had the pines cut.

Only a few well-intentioned people who begged to dig and transplant have been successful past the second year in satisfying their adopted plants. We don't understand their subtle needs. Our best policy is hands off. Left alone, the pink lady's slipper may be able to work its way off Georgia's list of protected plants.

Georgia checks the status of its rarest plants

A new look at endangered species

By Thomas S. Patrick and Charles V. Rabolli

Illustrated by Mozelle Funderburk

When a list of plants to be protected under a new Georgia law was drawn up in the late 1970s, it did not include the small whorled pogonia, *Isotria medeoloides*, a native orchid with drooping leaves of pale, dusty green and a flower with a yellow-green cast.

Then, in 1980, the pogonia was mentioned in a thesis for a Master of Science degree. According to the thesis, it was growing in Rabun County, Georgia. A sighting by Ben Sanders of the United States Forest Service in June 1985 confirmed its occurrence in the state.

Both the bent trillium, *Trillium flexipes*, and the Ohio buckeye, *Aesculus glabra*, whose wood was once used for making artificial limbs, also were only recently documented in Georgia.

Now all three of these species have been entered on the Georgia Natural Heritage Inventory monitoring list as potentially endangered species. Later, if given that classification officially, they will take their place on the list of special plants protected by state law.

It is a time of change and renewal in Georgia's efforts to preserve one of the most fragile and vulnerable components of its natural heritage: the rare, endangered, threatened, or unusual among an estimated 3,500-3,600 species of native and

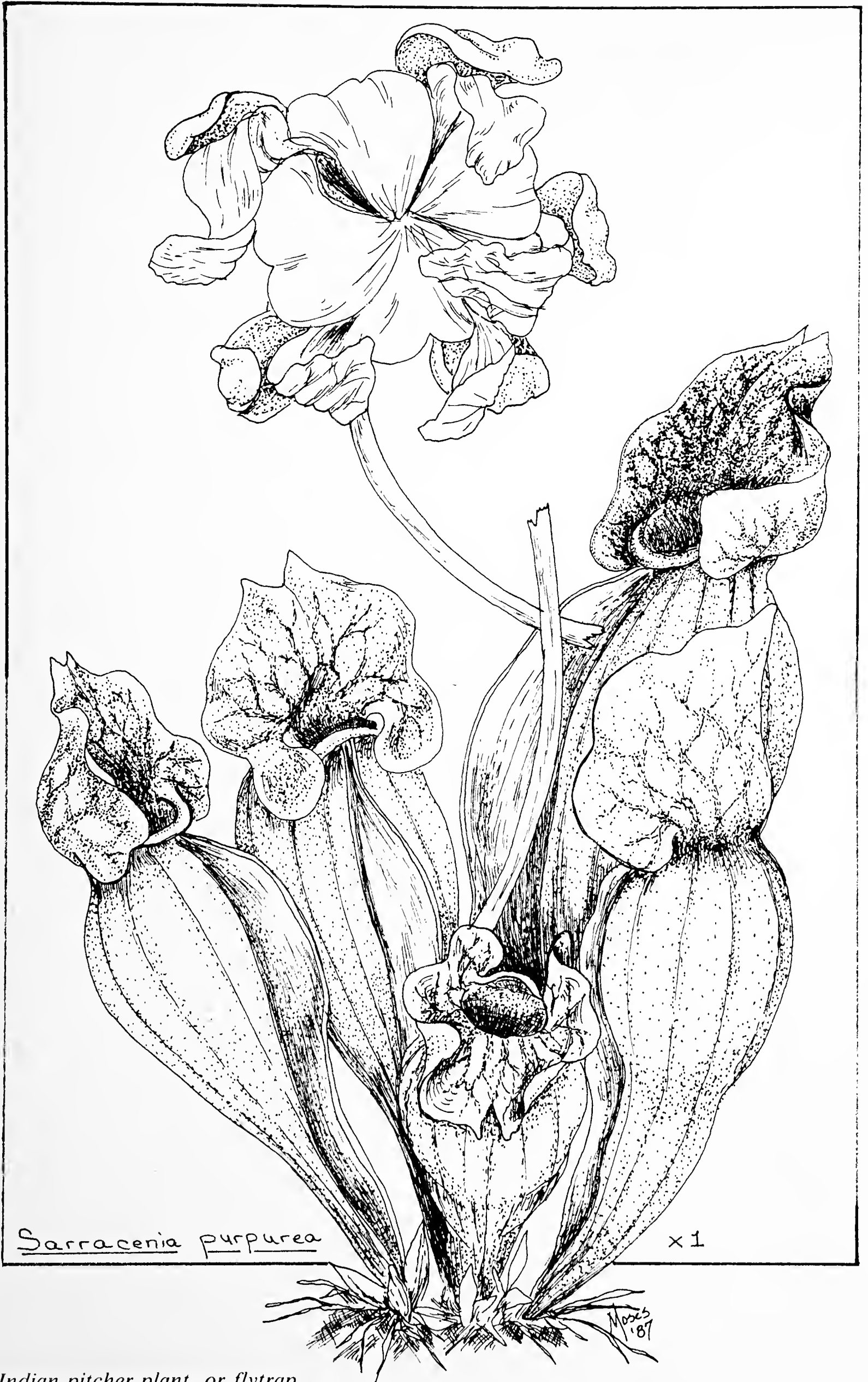
naturalized vascular plants growing wild in Georgia.

Many of those thousands of species are introduced "weeds" that originated in Asia, Africa, or elsewhere and, once here, escaped from cultivation and became naturalized. But even more of them are native, including some that are genuinely rare, like *Hydrastis canadensis*, the golden seal, or even extinct in the wild, like the well-known *Franklinia alatamaha*, the Franklin tree, which was last seen in its native habitat well over a century ago.

There are five physiographic provinces represented in Georgia—Blue Ridge, Ridge and Valley, Cumberland Plateau, Piedmont Plateau, and Coastal Plain. Because of this, there are a considerable variety of habitats and a great diversity of flora, offering a real challenge to the botanist.

The state's plant protection efforts date back to 1973, when passage of the federal Endangered Species Act led Georgia to pass a law of its own: the Wildflower Preservation Act. Soon afterward, Georgia's Plant Protection Program got underway.

The newest development in these efforts to preserve native plants now at risk is the Georgia Natural Heritage Inventory (GNHI), begun in August 1986 under the direction of the Game and



Indian pitcher plant, or flytrap.

Georgia's protected plants

ISOETACEAE
(Quillwort Family)
Isoetes melanospora,
quillwort
ASPLENIACEAE
(Spleenwort Family)
Asplenium heteroresiliens,
Morzenti spleenwort
TAXACEAE
(Yew Family)
Torreya taxifolia,
stinking-cedar
POACEAE
(Grass Family)
Panicum hirstii,
panic grass
Schizachyrium niveum,
broom sedge
CYPERACEAE
(Sedge Family)
Fimbristylis perpusilla,
Harper's fimbriatylis
Carex amplisquama,
sedge
Carex biltmoreana,
Biltmore sedge
Carex purpurifera,
sedge
Carex misera,
sedge
LILIACEAE
(Lily Family)
Trillium persistens,
persistent trillium
Veratrum woodii,
false hellebore
Hymenocallis coronaria,
spider lily
ROXBURGHACEAE
(Stemona Family)
Croomia pauciflora,
croomia
ORCHIDACEAE
(Orchid Family)
Cypripedium acaule,
pink lady's slipper
Cypripedium calceolus
var. *pubescens*,
yellow lady's slipper
SALICACEAE
(Willow Family)
Salix floridana,
Florida willow
FAGACEAE
(Beech Family)
Quercus oglethorpensis,
Oglethorpe oak
SANTALACEAE
(Sandalwood Family)
Nestronia umbellula,
nestronia

CARYOPHYLLACEAE
(Pink Family)
Silene polypetala,
fringed campion
RANUNCULACEAE
(Buttercup Family)
Hydrastis canadensis,
golden-seal
Thalictrum debile,
meadow-rue
BERBERIDACEAE
(Barberry Family)
Jeffersonia diphylla,
twinleaf
SCHISANDRACEAE
(Schisandra Family)
Schisandra glabra,
bay-star vine
LAURACEAE
(Laurel Family)
Litsea aestivalis,
pond-spice
BRASSICACEAE
(Mustard Family)
Draba aprica,
whitlow-wort
Leavenworthia exigua
var. *exigua*,
leavenworthia
Arabis georgiana,
rock-cress
SARRACENIACEAE
(Pitcher Plant Family)
Sarracenia flava,
golden or yellow trumpet
Sarracenia rubra,
sweet pitcher plant
Sarracenia minor,
hooded pitcher plant
Sarracenia purpurea,
Indian pitcher plant
Sarracenia leucophylla,
white trumpet
Sarracenia psittacina,
parrot pitcher plant
CRASSULACEAE
(Orpine Family)
Sedum pusillum,
dwarf stonecrop
ROSACEAE
(Rose Family)
Waldsteinia lobata,
barren strawberry
Potentilla tridentata,
three-tooth cinquefoil
HAMAMELIDACEAE
(Witch Hazel Family)
Fothergilla gardenii,
dwarf witch-alder
CAPRIFOLIACEAE
(Honeysuckle Family)
Viburnum bracteatum,
arrow-wood

FABACEAE
(Legume Family)
Baptisia arachnifera,
hairy rattleweed
LYTHRACEAE
(Loosestrife Family)
Lythrum curtissii,
loosestrife
HALORAGACEAE
(Water-milfoil Family)
Myriophyllum laxum,
water-milfoil
APIACEAE
(Carrot Family)
Oxypolis canbyi,
Canby's dropwort
ERICACEAE
(Heath Family)
Elliottia racemosa,
Georgia plume
Rhododendron prunifolium,
plumleaf azalea
or red honeysuckle
DIAPENSIACEAE
(Diapensia Family)
Shortia galacifolia,
Oconee bell
PRIMULACEAE
(Primrose Family)
Trientalis borealis,
star-flower
SAPOTACEAE
(Sapodilla Family)
Bumelia thornei,
buckthorn
CONVOLVULACEAE
(Morning-glory Family)
Cuscuta harperi,
Harper's dodder
LAMIACEAE
(Mint Family)
Scutellaria montana,
large-flowered skullcap
Physostegia veroniciformis,
false dragon-head
Calamintha dentata,
wild basil or calamint
SCROPHULARIACEAE
(Figwort Family)
Amphianthus pusillus,
amphianthus
Lindernia saxicola,
false pimpernel
ASTERACEAE
(Composite Family)
Cacalia diversifolia,
Indian-plantain
Hartwrightia floridana,
hartwrightia
Echinacea laevigata,
purple cone-flower
Senecio millefolium,
ragwort

Fish Division of the Department of Natural Resources (DNR), which administers the Plant Protection Program.

Already the new project is paying dividends. Forays into the more remote and therefore less studied regions of the state not only have uncovered species never before reported in the botanical literature of Georgia, but also have led to rediscoveries of plants not seen for over 20 years.

Fairly recently, for example, historical records of the September elm, *Ulmus serotina*, and the harbinger-of-spring, *Erigenia bulbosa*,

Federally protected

Eight plants found in Georgia are on the federal list of endangered species:

Baptisia arachnifera Duncan, hairy rat-tleweed. Found only in Georgia.

Isotria medeoloides (Pursh) Rafinesque, small whorled pagonia. Another *Isotria* not considered endangered, *I. verticillata*, the whorled pagonia, is found in about a dozen Georgia counties.

Lindera melissifolia (Walter) Blume, southern spicebush or Jove's-fruit. "Bushes make a brilliant show in early spring."—J. K. Small

Oxypolis canbyi (Coutler and Rose) Fernald, Canby's dropwort. A kindred species, *O. rigidior*, is called pig-potato.

Sarracenia oreophila (Kearney) Wherry, green pitcher plant. In addition to its erect, hollow leaves, this species has several shorter, sword-shaped leaves that do not have cavities. The flower has yellow-green petals.

Scutellaria montana Chapman, large-flowered skullcap. In general, skullcaps, or helmet-flowers, are not rare—there are about 100 species—but this one is.

Torreya taxifolia (Arnott) Greene, Florida torreya or stinking-cedar. "The wood is durable, and many of the better specimens have been destroyed for making fence posts. The seeds are a favorite food of wild rodents. The heartwood is pale yellow."—J. K. Small.

Trillium persistens Duncan, persistent trillium. In one family, this one is "Edna's trillium." See page 8, this issue.

a member of the carrot family, have been verified.

Georgia's inventory is modeled after similar programs in some 40 other states based on methodology of the Nature Conservancy. Data on the occurrence, status, and distribution of rare species serve as the backbone of this inventory and atlas of the ecological diversity of Georgia.

The first step in the inventory is a study of the entire native flora to determine the species that are currently the rarest and most endangered. Then these special plants are ranked in terms of rarity. Even these rankings may change as new information is obtained.

Accurate evidence for such determinations is slow in coming, however. A tremendous amount of field work, dependent on a volunteer network across Georgia, provides most of the rare plant data. This field work is a way for members of the Georgia Botanical Society to join in this vital endeavor.

The starting point for the Georgia Natural Heritage Inventory is the list of rare, endangered, threatened, or unusual species growing out of the state's 14-year-old Wildflower Preservation Act and the Plant Protection Program. Fifty-eight plant species are officially protected at the present time.

Georgia has eight of the 139 native American plants currently on the federal list of threatened or endangered species. The eight range from little-known plants such as the umbel, Canby's dropwort (*Oxypolis canbyi*), to the showier persistent trillium (*Trillium persistens*) and that infamous curiosity known as the green pitcher plant (*Sarracenia oreophila*).

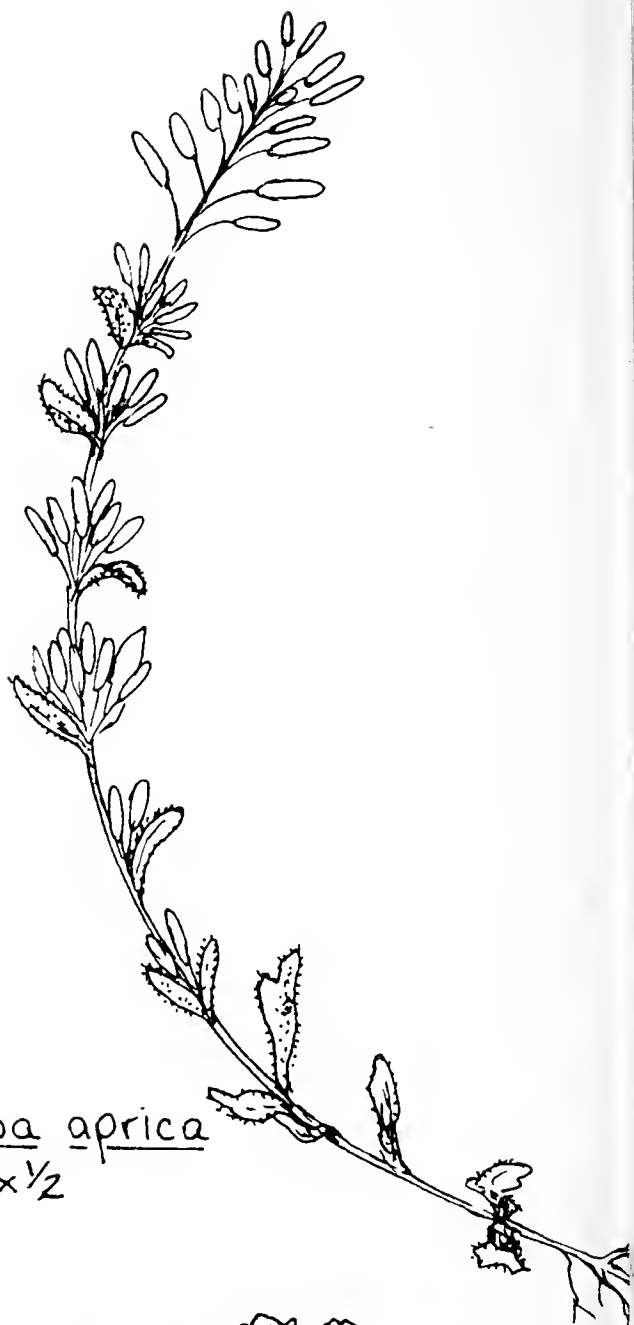
Several other species found in Georgia are being considered for federal listing, and both professional and amateur botanists will be called on to provide information on these rarer native plants.

Concern about the reduction of wild ginseng populations led to passage of a

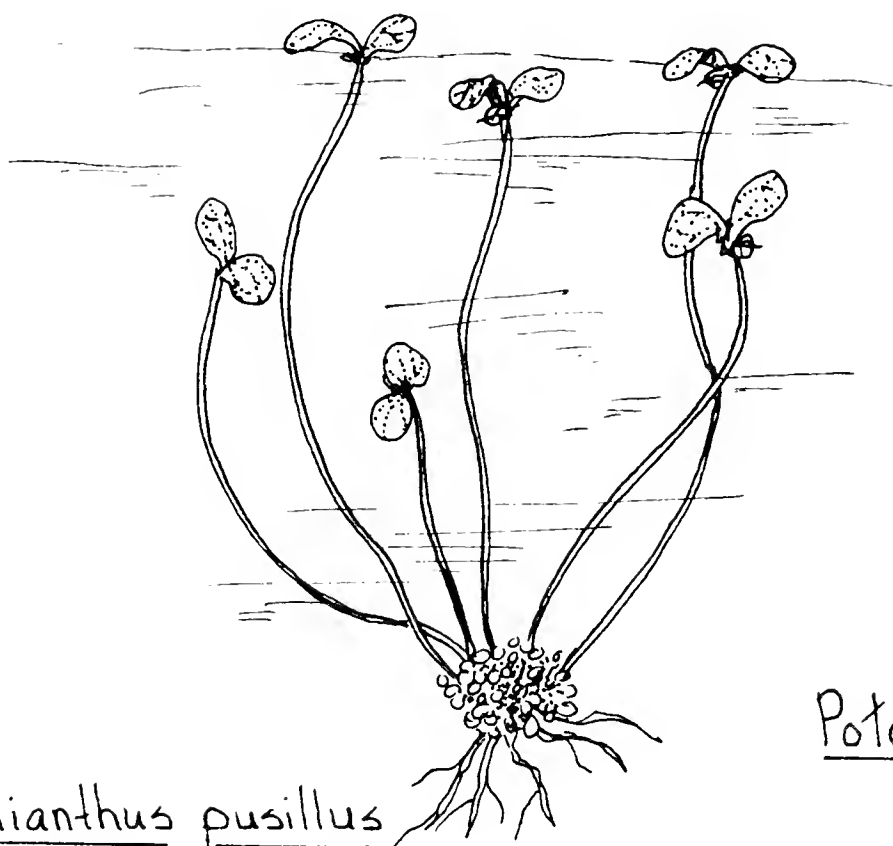
Clockwise from top left: golden-seal,
 whitlow-wort, twinleaf, spider lily,
 three-tooth cinquefoil, amphanthus.



Hydrastis canadensis
 x 1/2



Draba aprica
 x 1/2

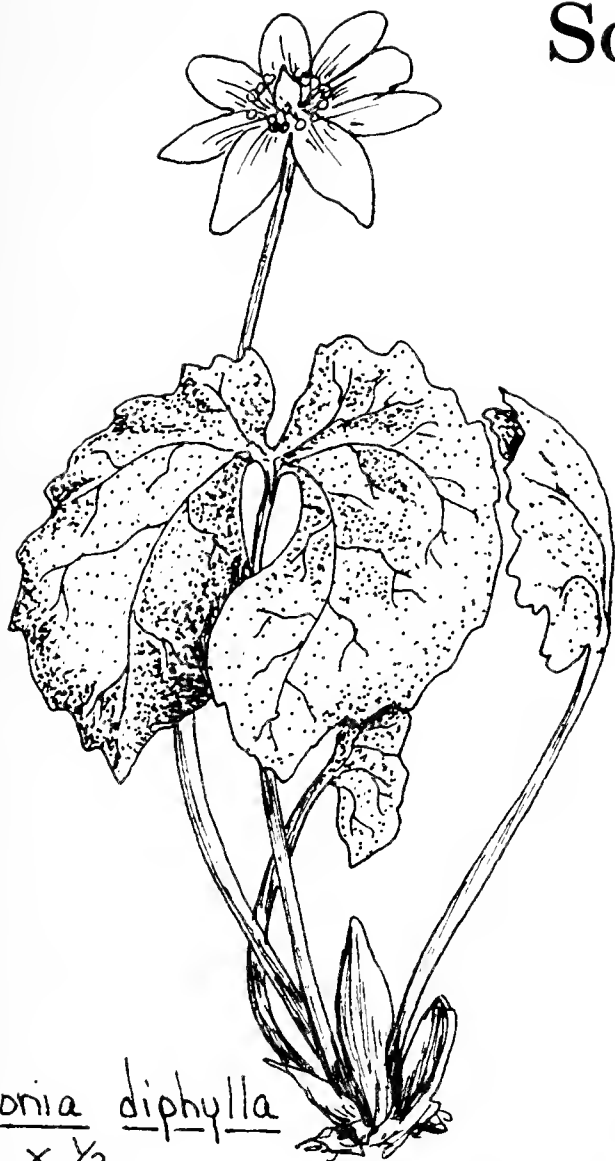


Amphianthus pusillus
 x 1



Potentilla tridentata
 x 1

Some Georgia rarities



Jeffersonia diphylla
x 1/2



Hymenocallis coronaria
x 1/2

Moses
187

special Georgia law in 1979 to protect the species, *Panax quinquefolium*, which is harvested commercially under regulations enforced by the state Game and Fish Division.

Federal listing carries more than the honor. Under the Endangered Species Act, listing means that federal funds may be made available to devise recovery plans and to support research into the biology and ecology of the species—things such as how many individual plants are needed to yield a healthy seed crop, what pollinates the flower, and what the preferred shade and light requirements are.

Two of the federally listed plants found in Georgia—the hairy rattleweed, *Baptisia arachnifera*, and *Sarracenia oreophila*—already are receiving special attention.

Research is in progress on the population and community structures of both species. Such information will be instrumental in developing protection and management strategies for them.

Surveys and research, which allow us to learn more about the status and biology of particular elements of Georgia's flora, are integral components of the Game and Fish Division's plant protection efforts. Much of this work is now being conducted under the Heritage Inventory program.

As of Dec. 31, 1986, the GNHI monitoring list consisted of approximately 350 species of vascular plants which are thought to be rare or about which not enough data are available to determine their status adequately. Additional information is always needed.

One aspect of the monitoring list is the highlighting of special plants not recently seen. Several of these plants are readily identifiable, and volunteers are needed to search for them.

Lists of species observed on various botanical excursions throughout the state should be brought to the attention of the Heritage staff. Also, the GNHI botanist continuously looks for new

sites where Georgia's special plants may be found.

Another important part of DNR's activities in connection with the inventory is a revitalization of assessing the natural history attributes of Georgia's remaining wild areas. As a result, some areas might possibly be acquired or protected in some other manner.

Already some natural areas in Georgia are managed as state conservation parks, like Panola Mountain, or as part of wildlife management areas, like Lewis Island.

Most of our natural areas, however, are privately held properties where the landowners have become aware, through the state's Natural Areas Program, of the special features of the sites and have agreed to register the areas and protect them.

The Game and Fish Division of DNR administers the Natural Areas Program as well as the Plant Protection Program. Sites may qualify for natural area designation by meeting one or more of the following criteria: (1) home of one or more endangered species; (2) an outstanding example of a biotic community; (3) a special geologic formation; (4) an area of outstanding scenic beauty.

The Wildflower Preservation Act does not prohibit collection or destruction of state-listed plants on private land, so the Division tries to engender an enthusiasm for voluntary protection of plants and their habitats.

A personal involvement by a site monitor, a voluntary land steward, or some other individual can provide significantly more protection to a population of rare plants than can the state's natural resource agency.

Copies of the state list of officially protected plants, the federal list of threatened and endangered species, and the Natural Heritage Inventory's monitoring list may be obtained from the Georgia Natural Heritage Inventory, Route 2, Box 119-D, Social Circle, Georgia 30279.

Shortia: solving one mystery

There's good evidence that Georgia is mistaken in claiming the Oconee bell as a native

By Steven M. Jones

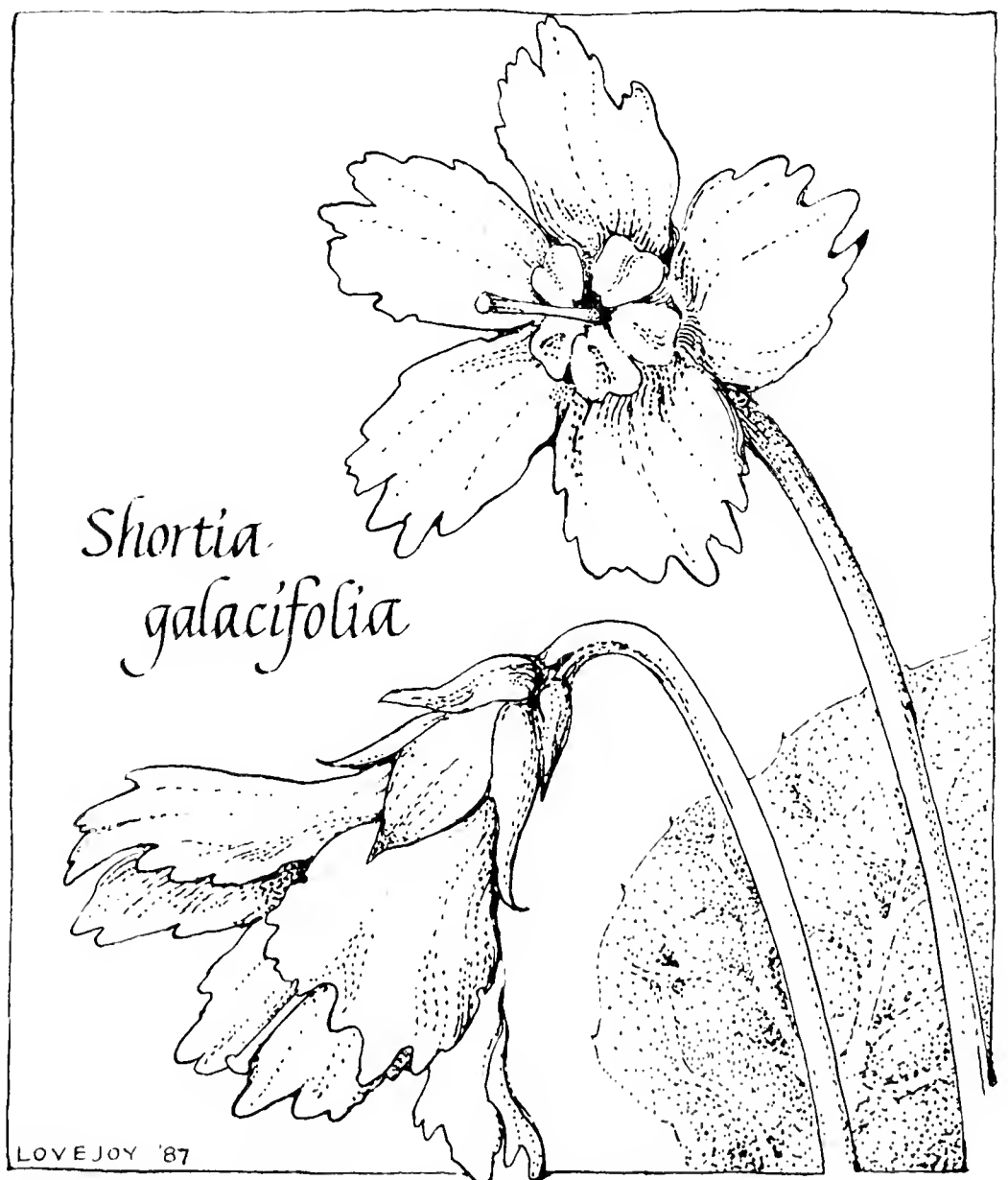
Illustrated by Lois Lovejoy

Perhaps it should be defined as irony, or simply coincidence. Nevertheless, the fact remains that exactly 200 years ago, in 1787, French botanist Andre Michaux (1746-1802) collected *Shortia galacifolia*, the Oconee bell, at the confluence of the Whitewater and Toxaway Rivers in Oconee County, South Carolina.

Although two centuries have passed, this crown jewel of the Jocassee Valley is still a topic of debate in botanical circles. Not even the inundation of the type location by a man-made lake some 20 years ago has silenced the debaters.

A series of mysteries has surrounded shortia. They were set off because Michaux died before he confirmed

*The Oconee bell:
a Georgia import?*



what he suspected: that this unfamiliar plant he had collected in the "hautes montagnes de Caroline," the high mountains of Carolina, was a new genus. He never assigned a name to it.

The unknown plant went unheralded until American botanist Asa Gray came across the pressed, flowerless specimen in the Michaux herbarium in Paris in 1839. Gray named it in honor of a Kentucky botanist, Charles W. Short.

For almost 40 years, however, Gray and other collectors could not find shortia. They mistakenly believed Michaux's label on the herbarium specimen in Paris to mean the "high mountains" northeast of Asheville, North Carolina, and they searched the area in vain.

Increasingly it looked like a futile quest. "The protracted failure of these endeavors has thrown an air of doubt over the minds of my associates in the search, as to the actual existence of any such plant," Gray wrote. He kept hoping, however.

The mystery was eventually solved in 1877, quite by chance, when a youth who was out gathering herbs with his father in McDowell County, North Carolina, came upon shortia on the banks of the Catawba River. But its principal habitat, where Michaux had collected his specimen, was not rediscovered for another decade.

Once shortia was found again, botanists labored to solve the mystery of its endemism. Their early efforts centered around the geographic limits of its distribution and the plant's abundance within that range. Once the restrictive nature of the distribution was realized, they naturally wanted to know the reasons for the limited range.

Research has shown that the species has no effective means of seed dispersal other than gravity or water flow. In addition, reproduction requires high moisture conditions and exposed mineral soil. Juvenile seedling mortality is high and even mature plants are

poor competitors. Because of this intolerance to competition, shortia is most commonly found in the deep shade of rhododendron and hemlock where no understory species survive.

These factors contribute to shortia's endemism, although they may not wholly account for it.

It is common knowledge to those who have observed the species in recent years that colonies can proliferate when dense overstories are removed by logging or other factors. Also, shortia can, and often does, prosper when planted outside its range.

Shortia galacifolia Torrey and Gray is on Georgia's official list of protected plants on the strength of a disjunct colony on Heddon Creek in Rabun County. This creek, in the extreme northeast corner of the state, flows west of Drip Nose Mountain and enters Reed Creek near Burrells Ford. Reed winds southward to the Chattooga River some three miles away.

The colony was reported by Wilbur H. Duncan of the University of Georgia in 1950 before details of shortia's unique ecological life history were known. It is my belief, along with most individuals who are intimately familiar with shortia, that the Georgia station is a planting.

I visited the station on April 28, 1977. The colony measured 6 feet by 7 feet and was located high on a steep slope at an elevation of 2,800 feet.

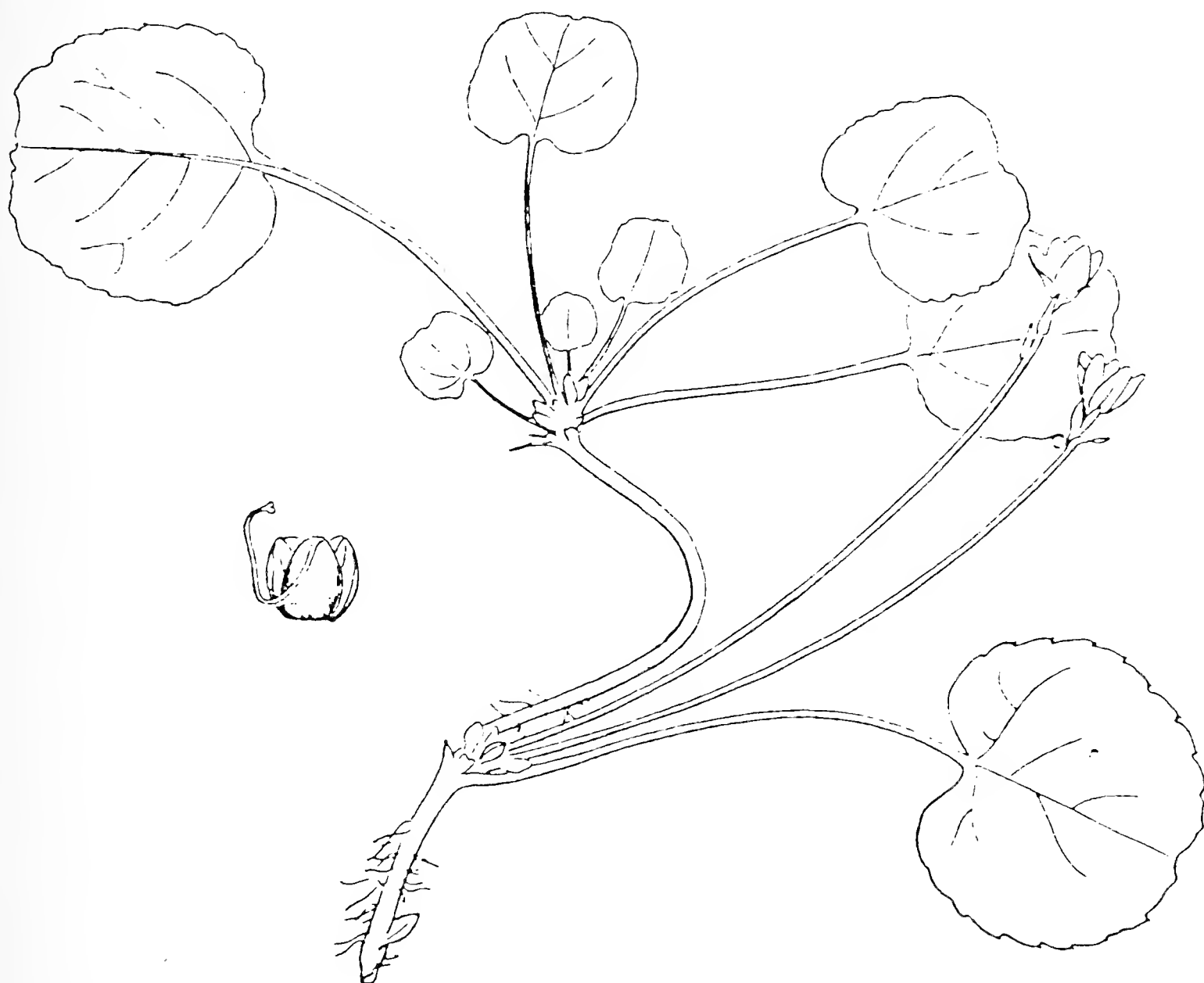
The colony was growing under a canopy of white pine (*Pinus strobus*) and rosebay rhododendron (*R. maximum*) in association with mountain laurel (*Kalmia latifolia*). Galax (*Galax aphylla*) was growing along the edges of the colony, and lowbush blueberry (*Vaccinium vacillans*) in the middle. Fifty-one flowers were counted. Numerous juvenile plants, apparently of seed origin, had established themselves about a foot downslope from the colony.

The first clue to the origin of the colony is the evidence of past human ac-

tivity within the immediate vicinity.

The colony was less than one-half mile downstream from an old home site. A footpath led from the home site to an impressive waterfall. The shortia was growing near this waterfall along the footpath. An old wagon wheel and

Perhaps an even more convincing clue to the origin of the Heddon Creek colony is the anomaly with respect to the site's elevation of 2,800 feet. The highest elevation ever reported for shortia in the Carolinas is 2,050 feet. Within the Jocassee Valley, elevation



Shortia galacifolia, from a drawing of the type specimen collected in South Carolina in 1787 by Michaux. Found in his Paris herbarium in 1839 by Asa Gray.

other debris consistent with habitation were also discovered along the footpath.

For some years after its discovery in the 1880s in the Jocassee Valley, shortia was extensively transplanted. Interviews with people familiar with the plant reveal that it was even used to decorate passenger cars of a tourist train traveling between Virginia and Lake Toxaway, a resort in North Carolina. So great was shortia's exploitation in the earlier part of this century that botanists feared extirpation of the species.

distinctly constrains shortia's distribution.

There is no reason to believe that elevation would fail to be a limiting factor to shortia in Georgia (or within the Chattooga drainage). Therefore, this author can only conclude that the Heddon Creek colony, being at a significantly higher elevation, is not naturally occurring.

It is my hope that during this year of the bicentennial of Michaux's collection of this delightful plant the mystery of its colonization in Georgia can be laid to rest.

Has Mike Dirr found the right answer to saving Silene polypetala—or the wrong one?

Cloning the champion

By Treadwell Rice Crown III

Modern technology is often blamed for threatening the existence of various species, violating their habitats, and generally creating a hostile and fouled environment. In Michael Dirr's tissue culture laboratory in the Department of Horticulture at the University of Georgia, however, modern technology is being applied to save some of Georgia's rarest plants from extinction.

Using a process called micropropagation, Dr. Dirr, a professor of horticulture, has been working on cloning the plants. One notable success is *Silene polypetala* (Walter) Fernald and Schubert, the fringed champion or catchfly, kin of the commoner fire pink (*S. virginica* Linnaeus), but flaunting frills instead of flame.

Silene polypetala has a lot going for it. A member of the pink family (Caryophyllaceae), the plant is a showy perennial with evergreen foliage. It reaches a height of 10 inches and is covered with bloom in late April and May. Its 1.5-inch-wide pink flowers are similar in appearance to garden pinks (*Dianthus* species), but have distinctly feathered petals.

The known native habitat for this rare beauty is restricted in Georgia to richly wooded bluffs along the Flint and Appalachian Rivers in three or four counties.

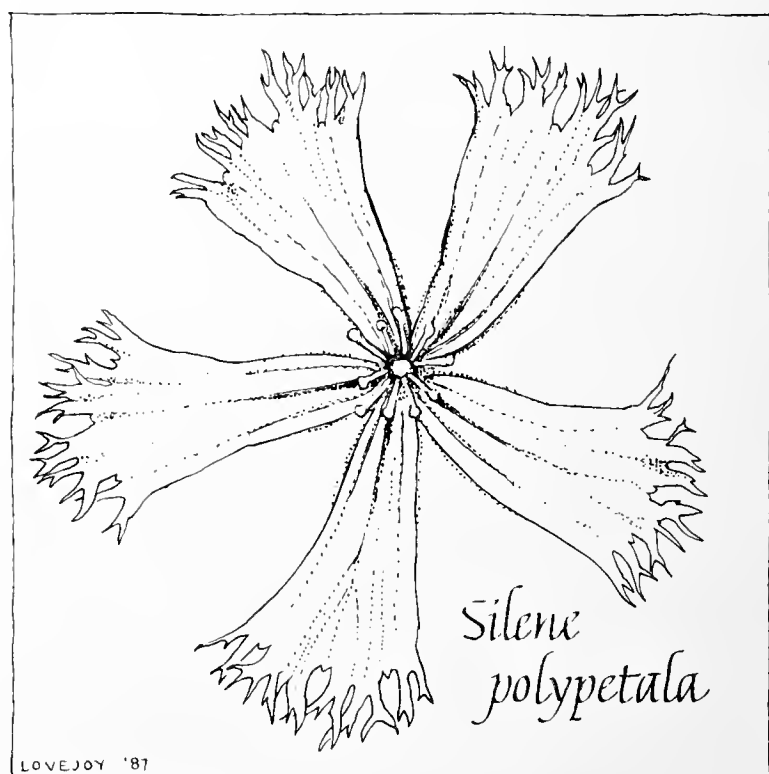
With the help of the Georgia Department of Natural Resources (DNR), the

fringed catchfly's range has been "extended" to the test tube. Dirr first set up his laboratory in 1980 while director of the University of Georgia Botanical Garden (now the State Botanical Garden of Georgia). When he returned to the horticulture department full-time, he took the lab along.

In the meantime, DNR had asked him to do some cloning of a number of endangered plant species. Thus began a relationship that provides DNR with quantities of plants to repopulate native stands and to establish new colonies.

DNR provides the material to the tissue culture lab, usually a new shoot, a terminal tip, or even a flower bud. For-

Drawing by Lois Lovejoy



Silene polypetala, fringed champion.

tunately for the already impacted plant community, only a very small amount of tissue is required to start a culture. This material must be sterilized thoroughly to avoid contaminating the medium in which it will be placed.

The medium is a precise mixture of nutrients needed for cell differentiation and growth, including minerals, vitamins, sugars, and hormones. The recipe for the medium is created through trial and error until a specific formula for a given species, such as *S. polypetala*, is reached. The test of a recipe's effectiveness lies in its ability to reproduce or propagate the tissue of the species over and over.

Once the pieces of tissue have been placed in the correct nutrient formula, their environment is closely monitored to see that they receive the correct amount of light and are held at the proper temperature.

They stay under these conditions until they have grown to a size that allows them to be transferred to a greenhouse, where they will grow on out in a potting-soil medium. Once established in pots, the plants are ready to be hardened off and transplanted outside.

S. polypetala has acquired quite a following. Micropropagation—cloning—is capable of producing vast quantities of plants in a short time, and Dirr has been able to supply nurserymen and appropriate individuals, as well as the DNR, with this rare native plant.

At least one retail nursery in the Athens, Georgia, area and several wholesale growers are now offering the fringed campion to customers. Growers can propagate the plant by rooting stem cuttings or simply by division. These methods work well, but cannot match the volume and speed of cloning.

The State Botanical Garden recently offered a plant of *Silene polypetala* as an inducement to join the garden's support group, calling it the "fringed companion." Thanks to the success of micropropagation, there are certainly more companions for the fringed cam-

pion now than there were a few years ago.

One drawback to this burgeoning horde of fringed campions is the total lack of genetic diversity among them. They all arise from the one plant provided to Dirr by DNR and are genetically identical to it.

This clone is still being asexually produced, and one nurseryman well-versed in growing plants from seeds has not been able to induce his fringed campions to set seed.

Perhaps this particular clone is sterile, or perhaps it is self-sterile and

'This clone is asexually produced; one nurseryman has not been able to induce his campions to set seed'

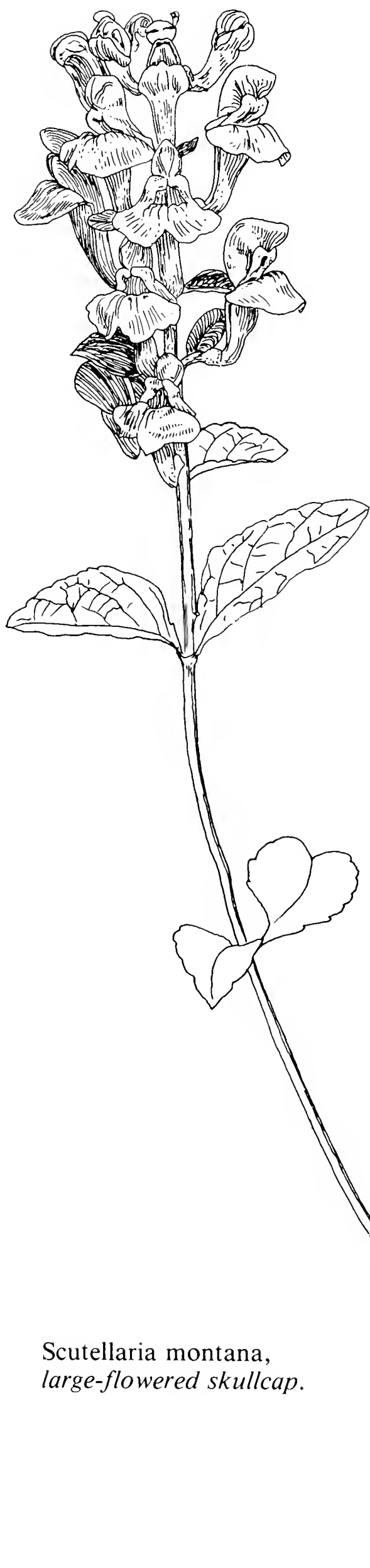
needs cross-pollinating. Or perhaps the entire remaining natural population of *S. polypetala* is sterile. This, if so, would contribute to the endangered status of the species.

Whatever factors are involved, the massive reproduction of one plant clone creates a false population.

So there is another point to consider in this truly technological triumph. Now that this catchfly is successfully cultured in the laboratory, it is unlikely to become extinct in the narrow sense. One culture can be maintained for years in a test tube, able to be manipulated into many hundreds or thousands of clones in a relatively short time.

The species also has shown itself adept at moving into nursery culture and apparently is well-suited as a garden perennial.

These are important steps to prevent the loss of an endangered species, but they are not the whole picture. To complete it requires focusing on the native habitat of *Silene polypetala* and protecting, studying, and understanding the plant as part of a whole.



Scutellaria montana,
large-flowered skullcap.

Showy, but not very sexy

Scutellaria montana
produces more
flowers than fruit

By Andrew C. Kemp
Illustrated by Cecile Smith

While botanizing on a forested mountainside in the Rome, Georgia, area in the 1870s, Alvin Wentworth Chapman (1809-1899), physician and botanist from Apalachicola, Florida, encountered an unfamiliar skullcap (*Scutellaria*). When he published its description in the *Botanical Gazette* in 1878, he bestowed on it an epithet honoring the type locality. Thus it became *Scutellaria montana* Chapman.

It is commonly called the large-flowered skullcap—"large-flowered" because its showy flowers are slightly larger than those of several other closely related species and "skullcap"

because, like other species of *Scutellaria*, the flowers, when viewed from the front, resemble the faces of human skulls.

From mid-May until early June, these perennial herbs, 12 to 24 inches tall, bear several flowers of white and pale blue in terminal racemes. Though the plant belongs to the mint family (Lamiaceae), the flowers are odorless.

The species that Dr. Chapman encountered in the Rome area some 110 years ago is still growing there—and in only a few other places.

In all, there are an estimated 13,500 to 23,500 *S. montana* plants in 19 known populations. Over 80 percent occur in just two populations: one with 10,000 to 20,000 plants in Marion County, Tennessee, in the Tennessee River gorge below Chattanooga, and the other, with 2,300 plants, in the Marshall Forest, a Nature Conservancy preserve on Horseleg Mountain in Rome.

Ownership of the site by a conservation organization gives the Marshall Forest population permanent protection, but the other sites are partly or wholly on privately owned land. Because the species is rare and its habitat threatened, *Scutellaria montana* was added to the federal list of endangered plants last summer.

Since then, however, J. Leo Collins and Charles P. Nicholson of the Tennessee Valley Authority have proposed a downgrading to threatened status on the basis of extensive surveys of the Marion County population, which previously had been reported as having only 5,000 plants.

The Marshall Forest population has been studied extensively. During field work in the early 1960s for her doctoral dissertation on the flora of the Marshall Forest area, Lewis Lipps noted the presence of *Scutellaria serrata* var. *montana* (Chapman) Penland. In 1976, Leo Collins included plants from this area in his study of 15 *Scutellaria* species for his Ph.D. dissertation at

Vanderbilt University. Collins established that *S. montana* is a true species, not a variety.

Lipps and Collins have continued to study *S. montana* with student volunteers from Shorter College in Rome participating, most notably Randall Ash, Kyle Stirling, and this author. We have concentrated on trying to discover what factors may be threatening the species with extinction and how it could be protected from extirpation.

One factor in the rarity of the large-flowered skullcap may be insufficient suitable habitat. The plant is found primarily on steep, south-facing slopes in oak-hickory-pine forests with canopy trees that are from 70 to 200 or more years old. Generally, the sites of present populations show no signs of cutting, grazing, or fire in the past 25 years at least. There are few such forests left in the Ridge and Valley Province.

Another factor contributing to the plant's rarity seems to be a low reproductive capacity or success rate. A study (unpublished) of 260 plants in the Marshall Forest in 1982 by student volunteer Stirling found that less than 40 percent of the flowers formed fruits and that 31 percent of the plants did not produce any fruit at all. In his 1976 dissertation, Collins reports that 75 percent to 93 percent of the flowers in related species of *Scutellaria* usually form fruits.

In a similar study of 71 plants during 1986, this author found that 65, or 91.5 percent, formed no fruits and that these fruits produced an average of only 2 seeds compared to 4 potential seeds. In fact, fewer than 50 seeds were produced by the 71 plants. The low number of seeds may have been due, however, to the drought of 1986.

Our search for the cause of the low reproductive success of *S. montana* in the Marshall Forest has not been revealing. Stirling has suggested that the flowers require cross-pollination in

order to produce fruit. During five years of field study, however, only a few bumblebees, a spring azure butterfly, a few other insects, and a hummingbird have been noted visiting the flowers. Is the scarcity of pollination vectors a cause of the plant's low reproductive success? Possibly, but we are not yet sure.

Other critical information about the life history of the large-flowered skullcap also remains obscure. Diverse studies examining possible parasites or diseases, chromosome abnormalities, and habitat or seasonal variables have produced no insights into the cause of the rarity of the species.

All of these studies have been short-term, so some of the answers we do not have may lie in crucial long-term trends or factors not yet explored.

Accordingly, I have established several study plots in the Marshall Forest in which I am observing individual *S. montana* plants to obtain information on their life history, including phenology, population flux, survivorship, and causes of mortality.

This long-term monitoring will also be useful in evaluating the ecological health of this species and of the Marshall Forest as a whole.

I also have collected seeds that will be used to study the large-flowered skullcap's germination requirements and to establish an artificial population for manipulative research purposes—for example, an exploration of Kyle Stirling's cross-pollination hypothesis.

A conservation management plan for the entire *S. montana* species is now in preparation.

LIST OF REFERENCES

Alvin Wentworth Chapman. 1878. An enumeration of some plants—chiefly from the semitropical regions of Florida—which are either new, or which have not hitherto been recorded as belonging to the flora of the southern states. *Botanical Gazette*, Vol. 3, pages 2-6, 9-12, 17-21.

Joseph Leo Collins. 1976. A revision of the annulate *Scutellaria* (Labiatae). Ph.D. dissertation, Vanderbilt University.

Lewis Lipps and H. R. DeSelm. 1969. The vascular flora of the Marshall Forest, Rome, Georgia. *Castanea*, Vol. 34, pages 414-432.

Lamb's ears: a mint from far away

By Ruth E. Bell

Part of my job as technical assistant at Lockerly Arboretum in Milledgeville, Georgia, is to plan and plant our herb beds. We have three: culinary, fragrance, and medicinal.

One special favorite in the medicinal bed is *Stachys byzantina*, lamb's ears, a member of the mint family native to Turkey and southwest Asia. School children visiting the arboretum love to touch the downy-soft, 3-inch-long, silvery leaves, and they always ask what its medicinal use is.

For a time I had no answer. Available literature stated the uses simply as medicinal and culinary without giving particulars.

Once I thought I was about to find out from a visitor from Holland. When she saw lamb's ear among our herbs, she exclaimed delightedly, "We have *that* in our gardens!"

"Do you *use* it in your country?" I inquired hopefully.

"Oh, yes," she replied. "The adults will take a leaf and place it on their noses (I believe she said *schnozzle*) when walking in downtown areas." She demonstrated by sliding the leaf petiole under the bridge of my glasses.

"Well, yes," I said, "but what does that do?"

"You know, it's to be a joke; it's funny; we laugh at one another when we see it."

So I still had no answer, really.

Then one day when I was relating the incident to a fourth-grade group, one bright youngster quipped, "Well, after all, laughter *is* the best medicine."

There is another answer, of course. An infusion—an extract—from lamb's ears has been used as a headache remedy. In cooking, the ears can serve as a thickening agent for soups and stews.

According to J. K. Small, there are about 160 species of *Stachys*, the hedge-nettles. There is even one, *S. clingmanii*, named for Clingman's Dome in the Great Smoky Mountains, where Small found it.

Lamb's ears has a relative called mouse-ear. It is *S. italica*, a native of Europe that went wild in America.

Stachys means spike.

Addenda

Pea Pickers

The sharp eyes of John D. Freeman, associate professor of botany and herbarium curator at Auburn University, caught a misidentified legume in the November 1986 issue of *Tipularia* ("Feeding the *Lepidoptera*," Treadwell Rice Crown III, pages 32-36).

When John Abbot painted his "Wild Pea Vine" in 1782, he had little interest in the scientific name that his English editor, James E. Smith, would apply to it. Smith's inappropriate designation of the plant as *Clitoria mariana* Linnaeus escaped correction for 200 years, until spied by Professor Freeman, who recognized it as the superficially similar *Centrosema virginianum* (L.) Benth.

"Many wildflower enthusiasts are unaware that there are two different 'butterfly-peas' in the Southeast, much less how one can tell them apart," Freeman wrote us. It is likely that Abbot, too, was unaware of the distinction. Botany was not his strong point, especially in the early part of his career — the period in which he painted the swallow-tailed skipper butterfly and the pea vine. His knowledge of plants improved with help from Savannah naturalist Augustus Oemler.

Freeman provided detailed botanical descriptions to support his identification and companionably noted: "Were it not for the experience of checking countless plant collections made by my students during summer (when both species come into flower), probably this case of misidentification would not have been obvious to me."

We appreciate his efforts to correct the mislabeling, and concur with his outlook: "I always view my own misidentifications as simply a new learning experience when either I or someone else points them out." — *T.R.C. III.*

More Arkansas Oaks

David M. Hunt of the Department of Botany at the University of Georgia, Athens, has come up with some new information about the Arkansas oak, *Quercus arkansana*, in Georgia.

Hunt reports (see "Distribution of *Quercus arkansana* in Georgia," *Castanea*, September 1986) that an intensive five-day



Drawing by Lois Lovejoy

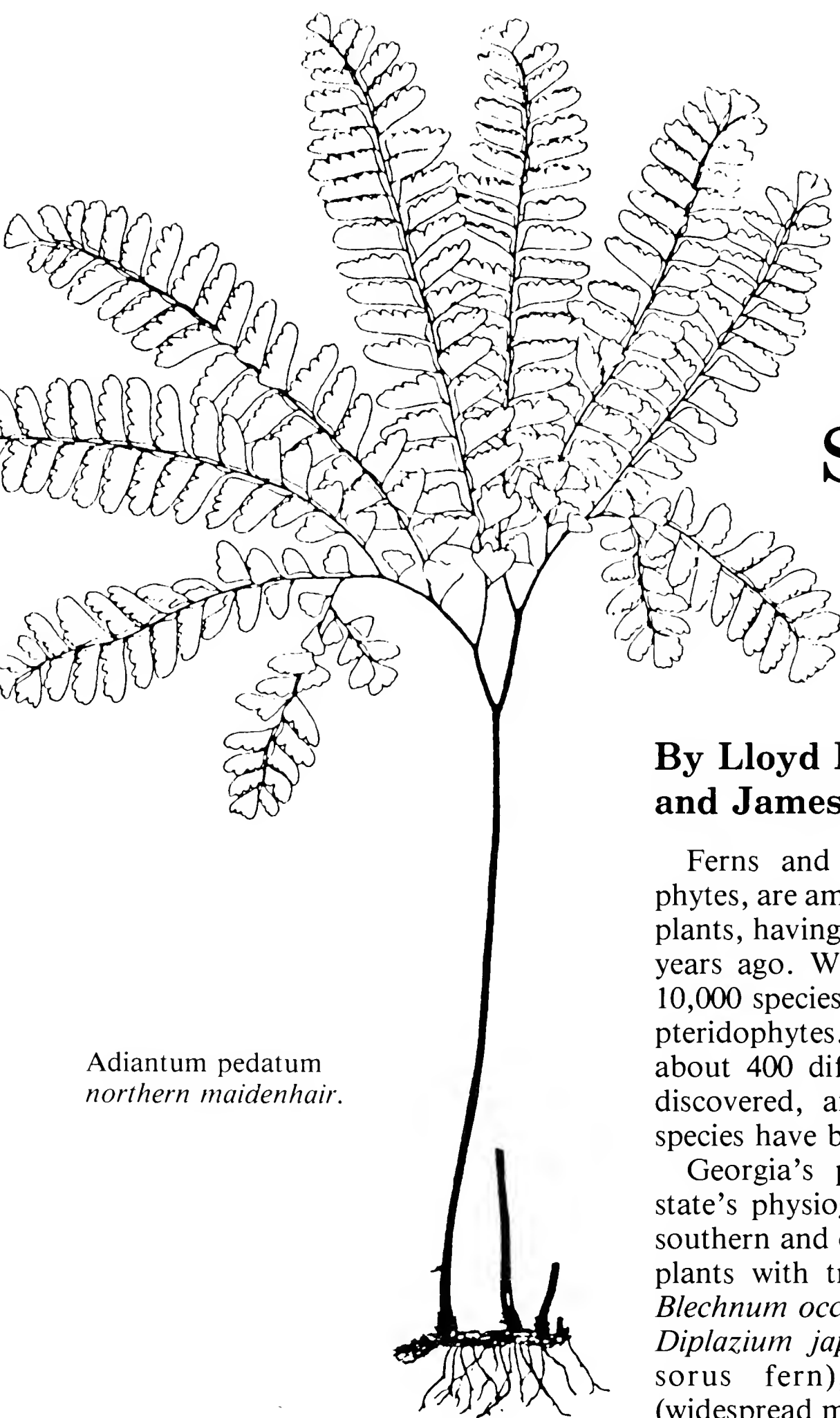
Two butterfly-peas, Clitoria mariana (top) and Centrosema virginianum. Some people don't always recognize the difference.

search in southwest Georgia turned up the oak in eight counties: Marion, Randolph, Stewart, Clay, Webster, Chattahoochee, Early, and Quitman. He speculates that it could occur in Calhoun and Muscogee Counties also.

In its November 1986 issue, *Tipularia* reported the oak as having been found in only two counties, Randolph and Tift ("Finding the Oaks," page 21). The source of that information was the Georgia Botanical Society's "Atlas of the Vascular Flora of Georgia," which was published in 1984 and thus predates Hunt's study.

Hunt has eliminated Tift from the list of counties. That record, he says, was based on a misidentified specimen of the black oak, *Q. velutina* Lamarck.

Quercus arkansana remains one of the scarcest species in Georgia. Hunt rates it as "a good candidate for the rare and endangered species list for the state" and urges an effort to assure its survival in Georgia. — *M.S.*



Adiantum pedatum
northern maidenhair.

Lloyd Snyder's ferns

**By Lloyd H. Snyder Jr.
and James G. Bruce**

Ferns and fern allies, or pteridophytes, are among the oldest of our land plants, having evolved some 400 million years ago. Worldwide there are about 10,000 species of ferns and 1,000 other pteridophytes. In the United States about 400 different species have been discovered, and currently 119 known species have been found in Georgia.

Georgia's pteridophytes reflect the state's physiographic diversity. In the southern and coastal regions are several plants with tropical affinities such as *Blechnum occidentale* (hammock fern), *Diplazium japonicum* (Japanese twin-sorus fern), *Thelypteris kunthii* (widespread maiden fern), *T. torresiana* (Mariana maiden fern), *T. hispidula* (variable maiden fern), *Lycopodium*

Illustrations from the book

Adapted from "Field Guide to the Ferns and Other Pteridophytes of Georgia" by Lloyd H. Snyder Jr. and James G. Bruce. Copyright 1986 by the University of Georgia Press, Athens, Georgia 30602.

cernuum (nodding clubmoss), and *Psilotum nudum* (whisk fern).

Conversely, in the northern mountainous areas are distinctly boreal ferns such as *Dryopteris goldiana* (Goldie's wood fern), *D. intermedia* (evergreen wood fern), *Osmunda claytoniana* (interrupted fern), and *Polypodium virginianum* (rockcap fern).

As Rogers McVaugh and Joseph H. Pyron state in their book ("Ferns of Georgia," University of Georgia Press, 1951): "A work of this kind is never finished. We shall never know all that there is to know about the ferns of Georgia."

We hope that our book will stimulate new contributions to the knowledge of ferns. The University of Georgia continues to welcome additional records and information.

Northern maidenhair fern, *Adiantum pedatum* Linnaeus. *Adiantum*, meaning "not to wet," was the Greek name for a fern whose leaves shed water. Carl Linnaeus adopted the name in 1753, when he also named the present species from American material. The epithet, meaning "decreasing outward, like the toes," refers to the outline of the leaf blade.

Georgia range: Common in the mountains of northern Georgia and found in a few scattered Coastal Plain counties.

Stalked adder's tongue fern, *Ophioglossum petiolatum* Hooker. Sir William Hooker, a British taxonomist, named this fern in 1823. *Petiolatum* means "with a stalk at the base of the blade."

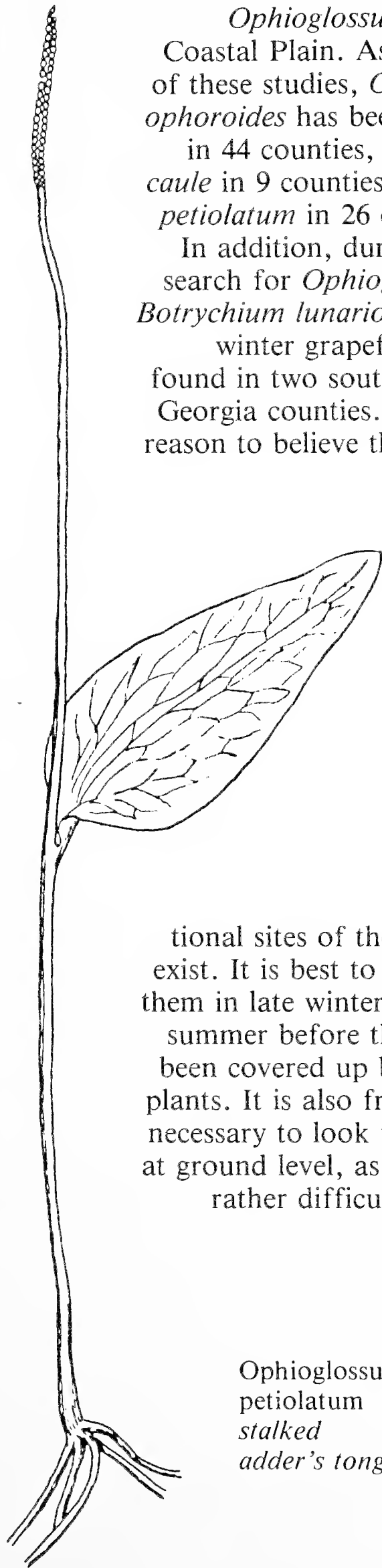
Georgia range: In almost all counties of the Lower Coastal Plain.

Remarks: Prior to 1966 the only record of *Ophioglossum* from the Georgia Coastal Plain was *O. nudicaule* from Effingham County. In that year Juanita Norsworthy, following an intensive study of the pteridophytes of Echols County, reported finding there

both *O. nudicaule* and *O. petiolatum*. Since then, she and her husband, Wayne R. Faircloth, and others have made extensive searches for

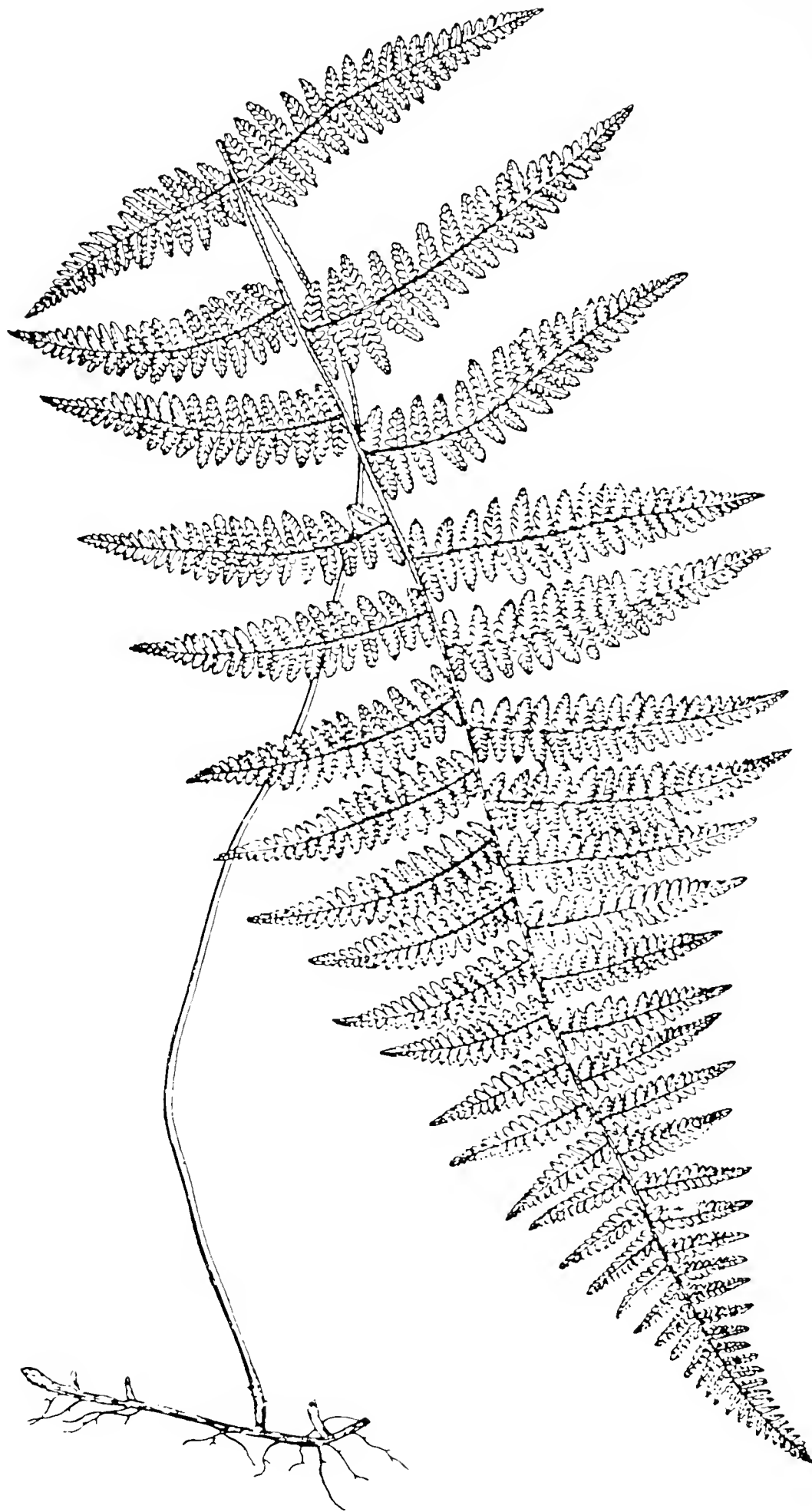
Ophioglossum in the Coastal Plain. As a result of these studies, *O. crotalophoroides* has been found in 44 counties, *O. nudicaule* in 9 counties, and *O. petiolatum* in 26 counties.

In addition, during their search for *Ophioglossum*, *Botrychium lunarioides*, the winter grapefern, was found in two south central Georgia counties. There is reason to believe that addi-



tional sites of these ferns exist. It is best to look for them in late winter to early summer before they have been covered up by larger plants. It is also frequently necessary to look for them at ground level, as they are rather difficult to see.

Ophioglossum
petiolatum
stalked
adder's tongue.



Dennstaedtia punctilobula, the hay-scented fern, sometimes has fronds 3 feet tall or taller.

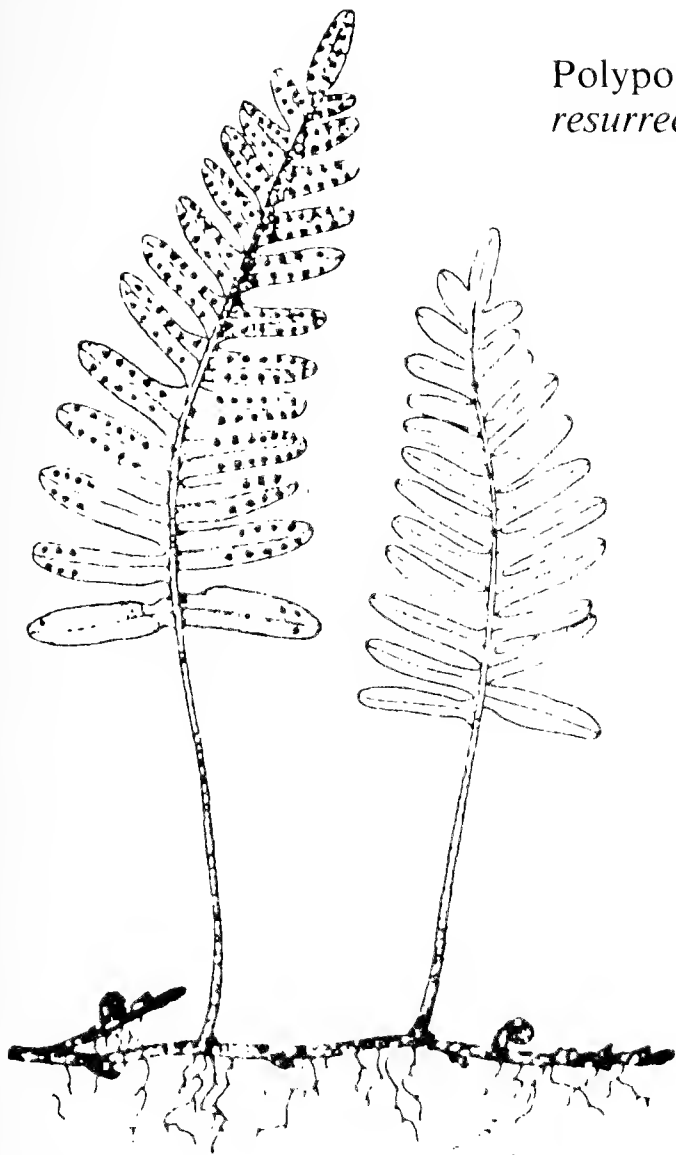
Hay-scented fern, *Dennstaedtia punctilobula* (Michaux) Moore. Andre Michaux discovered this fern, probably in Canada, and named it *Nephrodium punctilobulum* (in "Flora Boreali-Americana," published posthumously in 1803). In 1857 Thomas Moore transferred it to *Dennstaedtia*, a genus named by Johann Jacob Bernhardt in 1801 in honor of the German botanist August Wilhelm Dennstaedt. *Punctilobula*, meaning "having small, pointed lobes," refers to the appearance

of the pinnules. "Hay-scented" comes from the alfalfa-like fragrance of the fronds.

Georgia range: Common in the mountains of northern Georgia southward to Fulton and DeKalb counties.

Walking fern, *Camptosorus rhizophyllus* (L.) Link. Linnaeus named this fern in 1753 from an American plant. In 1833 Johann Heinrich Friedrich Link established the genus

Polypodium polypodioides,
resurrection fern.

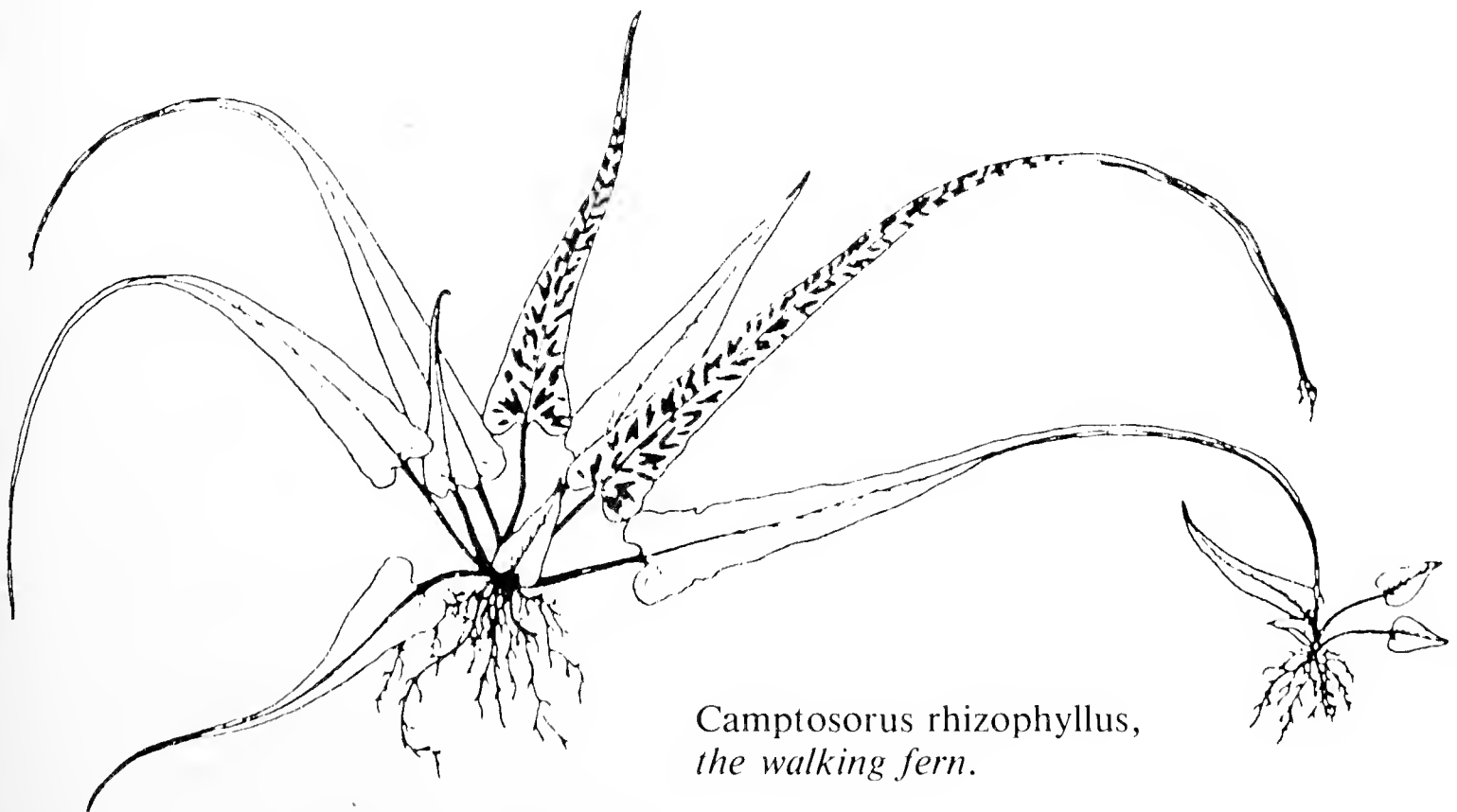


Camptosorus and included this fern in it. *Camptosorus*, from the Greek words meaning “bent” and “sorus,” refers to the irregular soral arrangement. The common name “walking fern” and the specific epithet *rhizophyllus*, meaning “root leaf,” come from the ability of the plant to root at the tip of its leaves.

Georgia range: Primarily in the limestone regions of the northern counties.

Resurrection fern, *Polypodium polypodioides* (L.) Watt. Linnaeus named *Acrostichum polypodioides* in 1753, the epithet meaning “like a *polypodium*.” David Allan Poe Watt transferred it to the *Polypodium* genus, so that the scientific name means “a *Polypodium*-like *Polypodium*.” The common name of “resurrection fern” is given because the fronds curl up in dry weather and appear to be dead, and are at once revived by rain.

Georgia range: One of the most common ferns and found throughout the state. Especially prolific on trees in the Atlantic coastal areas.



Camptosorus rhizophyllus,
the walking fern.

The adventures of an abecedarian

By Lloyd H. Snyder Jr.

When I retired, I became interested in horticulture and botany as a hobby, even though I knew nothing about them. As a start, my wife Annice and I attended a dozen or so one-day workshops at Callaway Gardens.

A course on ferns especially interested me, and I started transplanting some to my yard and experimenting with growing ferns from spores.

When a volunteer fern that I couldn't identify showed up in one of my pots, I took it to the botany department at the University of Georgia in Athens to try to find out what it was. James G. Bruce, then an assistant professor of botany there, not only identified the fern, but also introduced me to the herbarium and showed me a set of maps he'd made of the county location of each fern on file.

I mentioned that I knew where to find some that weren't on his maps and suggested that I'd be glad to collect them. Dr. Bruce took me up on the idea, showed me how to collect, press, and identify specimens, and gave me a set of his maps.

That, as it turned out, was the beginning of "Field Guide to the Ferns and Other Pteridophytes of Georgia," which was published last September by the University of Georgia Press.

At first I collected only specimens of ferns I knew about, but soon I began trying to get a specimen of every species growing in every one of Georgia's 159 counties.

When I took a trip anywhere in the state, I'd travel side roads and stop at bridges and other spots where ferns might be growing. About this time I joined the Georgia Botanical Society. The field trips helped me learn new areas, and I'd look for ferns going and coming, too.

For example, on one such stop after a field trip at Valdosta led by Wayne R. Faircloth, chairman of the Department of Biology at Valdosta State College, I found *Diplazium japonicum*, the Japanese twin-sorus fern, in Berrien County. Over the years Dr. Faircloth has helped me locate and learn the ferns of south central Georgia.

Through Bot Soc I met Marge White, a fern enthusiast in Houston County, and

Annice and I went there several times to collect fern specimens with Marge.

Others have been helpful in various places. A brother-in-law living in Statesboro worked several surrounding counties with me. David Emory, a past president of Bot Soc, accompanied me on trips from Atlanta to Macon, Columbus, and even farther south. Marie Mellinger showed me some locations in Rabun County, and Harriett DiGioia in the Cohuttas.

Of course, ferns aren't always in easy reach. Once, at a bridge where impenetrable growth surrounded some ferns, I lowered my young grandson by rope to do the collecting. I got my ferns, but also a reprimand from his mother and grandmother!

Mosquitoes and gnats are bothersome in many parts of Georgia, and in one place deer flies literally drove me away. But probably my worst experience came in Rabun County when Marie Mellinger and I were leading a fern field trip: I stepped on a yellowjacket nest, and they really let me know what they thought about that.

Eventually I got into all 159 counties and every state park at least once, and in many cases several times. After three or four years, I'd collected more than 800 new county records and increased the university herbarium's collections by over 50 percent.

One effect of this was to make "Ferns of Georgia" by Rogers McVaugh and Joseph H. Pyron, which was published in 1951, somewhat out-of-date. It listed some 80 pteridophytes in the state, and we now had more than 100. The range had been extended considerably.

So I proposed a revision of McVaugh-Pyron to the University of Georgia Press, but later we decided to start from scratch. Jim Bruce, who by then was with an Athens nursery instead of the university, became coauthor to make up for my botanical deficiencies. The writing took two or three years, and there were other preliminaries before publication.

Now that the book is out, people ask, "What's your next project?" Actually I haven't finished this one. There are still many fern sites to check out and many county records to be collected.

*A Fall Line site
with 300 species
of native plants*

One man's wilderness

By Harold C. Jones

Illustrated by Faith Birkhead

A naturalist, such as I, desires a homesite close to native wild creatures, a wilderness to explore, enjoy, and protect. In 1982, I found such a homesite, of small acreage, adjacent to a tributary of Camp Creek in southeast Baldwin County on Georgia's Fall Line.

Camp Creek is a small tributary of the Oconee River. It drains partly the Piedmont and partly the Coastal Plain; hence the vegetation along it is an interesting mixture of species. Habitats include moist stream banks, flood plain, wooded slopes, ravines with east-west orientation, and more open upland environments.

In this varied wilderness I have found, thus far, seven species of ferns and more than 300 species of seed plants. The latter include 42 species of large trees, 38 of small trees and shrubs, five of vines, and more than 200 of herbaceous plants.

Logging has removed most of the accessible pines, of which the loblolly (*Pinus taeda*) has been most common. A few short-leaf pines (*P. echinata*) and slash pines (*P. elliottii*) occur on the uplands.

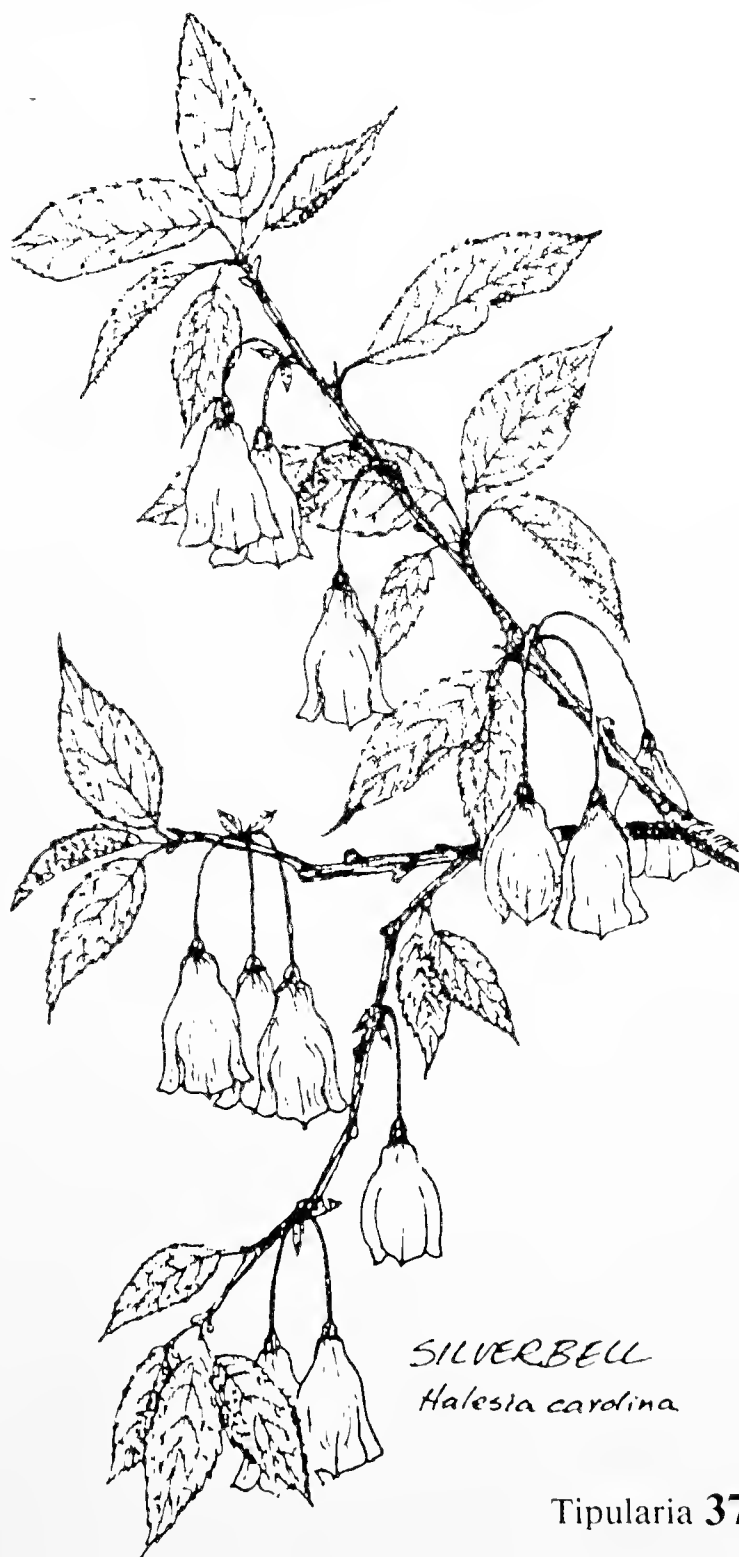
Most of the forest trees are deciduous hardwoods such as oaks, hickories, gums, maples, and the tulip

tree (*Liriodendron tulipifera*). Understory associates of these taller trees include hornbeams, dogwood, redbud, and many kinds of shrubs, vines, and herbs.

Beech occurs here widely, but large beeches live only near the creek or on nearby slopes. These inspired us to name our homesite Beechwood Cove.

Few plants can grow in the shade of these beeches, but the evergreen pink rhododendron, *Rhododendron minus* Michaux, does occur on rock outcrops, and the yellow trout lily, *Erythronium americanum*, succeeds by completing its flowering before the beech leaves mature.

The creek bank is habitat for red buckeye, tag alder, ironwood, and black willow. Most of these flower in March. A blue gentian, *Gentiana saponaria*, puts out its cluster of bottle flowers in November and December.



Colonies of southern lady fern and netted chain fern crowd the water's edge.

At a point upstream from our place, the creek divides to form a small island. Here, in late April, I discovered a small tree with drooping, pinkish-white blooms. It proved to be a silverbell, *Halesia carolina*. Here I also found the glossy, green-and-white spotted wintergreen, or pipsissewa. It flowers in June.

The river birch is a flood-plain tree; it occurs here, but is not common. Privet is common, forming thickets with cane (*Arundinaria gigantea*). These shelter southern grapeferns. A colony of parasol-shaped May-apple is established on the lower east slope.

From this point, a rather steep climb leads to a narrow, deep ravine. In the ravine and on its slopes, the large trees (trunk diameters of a foot or more) include red maple, southern sugar maple, red oak, white oak, Spanish oak, pignut, mockernut, loblolly pine, and tulip trees.

At the ravine's upper (eastern) end, tulip trees form a towering grove. Sweet-gum is also an important member of this plant community.

Hop hornbeam and flowering dogwood are the most numerous understory trees. Shrubs here include the wild or pinxter-flower azalea (*Rhododendron nudiflorum*), sweet-shrub, New Jersey tea, high-bush huckleberry, fringe-tree (*Chionanthus virginicus*), mountain hydrangea (or seven-bark), and strawberry bush, also popularly called hearts-a-bustin'.

Christmas fern is numerous. Cinnamon fern occurs in the deepest channel; in May, its cinnamon-brown spore-bearing fronds uncoil and spores are shed.

Many of the herbs flower in March, April, and May: bloodroot; violets, including the wood-violet, *Viola papilionacea*, which thrives in the ravine channel; green-and-gold; bellwort; and two trilliums, little sweet Betsy (*T. cuneatum*), and Catesby's.

There is a wild onion, *Allium cuthbertii*, whose abundant flowering resembles a thin carpet of snowflakes.

Spring also brings flowering of yellow mandarin, Solomon's seal, false Solomon's seal, wild geranium, heart leaf (*Hexastylis arifolia*), a spiderwort (*Tradescantia rosea*), and partridge berry. In August, two orchids, *Goodyera pubescens* and *Tipularia discolor*, come into flower.

My wilderness also has sourwoods, winged elms, sparkleberrys, French mulberry (*Callicarpa americana*), and bear-grass, muscadine, Virginia creeper, robin's-plantain, white vetch, and a couple of parasites: beech-drops, which are parasitic to beech roots, and a snapdragon relative, the yellow-flowered *Aureolaria laevigata*, one of the false foxgloves, a partial root parasite of white oak and post oak.

There is no wasteland in my wilderness. Even the ravines that contain no running water provide conditions favorable to a wealth of species. A naturalist could ask no more.

REFERENCE

M. Boyd Edwards and W. Henry McNab. 1986. A comparison of two recently undisturbed forest communities in the Lower Piedmont of Georgia. Georgia Journal of Science, Vol. 44, No. 3, pages 96-103.



Research Report

Tea, tongue, gum, grass, and grapes

Edited by Harriett L. Whipple

James R. Allison of Snellville, Georgia, and Michael J. Murphy of Athens, Georgia, botany graduates of the University of Georgia, are interested in an unknown species of *Allium* common to granite outcrops.

Helen Brown, associate professor of biology, Clayton State College, is beginning a five-year study of the effects of English ivy, *Hedera helix*, on forest floor vegetation. The study plots are in the Reynolds Nature Preserve at Morrow in Clayton County, Georgia.

Linda G. Chafin, graduate student in botany, University of Georgia, is studying the flora of two balds in Towns County and Union County, Georgia.

Richard Carter, assistant professor of biology and herbarium curator, Valdosta State College, is investigating the flora of the Gulf Atlantic Coastal Plains, specifically the genus *Cyperus*, the sweet-rushes.

Nancy Coile, herbarium curator, University of Georgia, is using flavonoid chemistry and electronic-scanning microscopy to study the systematics of eight deciduous-leaved species of *Ceanothus*. *C. americanus*, New Jersey tea, is perhaps the most familiar species of this genus to many amateur botanists.

Wayne R. Faircloth, professor of biology, Valdosta State College, is working with *Ophioglossum*, adder's-tongue. He reports that this plant is best studied in winter.

David E. Giannasi, associate professor of botany, University of Georgia, is studying the systematics of the Hamamelidaceae, the family of sweet-gum, witch-hazel, and witch-alder.

William Houghton, graduate student in botany, University of Georgia, is studying the taxonomy of the southeastern species of *Myrica* (wax myrtle, bayberry).

Carol Howel, graduate student in botany, University of Georgia, is comparing the flora of High Falls State Park and Indian Springs State Park, between Atlanta and Macon, Georgia.

David M. Hunt, graduate student in botany, University of Georgia, has been working with the *Laurifoliae*, *Nigrae*, and *Marilandicae* series of *Quercus* (oaks).

Samuel B. Jones, Jr., professor of botany, University of Georgia, and naturalist/photographer Leonard E. Foote of Waleska, Georgia, have in manuscript a book on the shrubs of the Southeast.

Gregory Krakow, graduate student in botany, University of Georgia, is doing research on the deciduous species of *Ilex*, the hollies.

Roger Laushman, graduate student in botany, University of Georgia, is studying the population biology of *Triglochin*, arrow grass.

Michael O. Moore, graduate student in botany, University of Georgia, is investigating the systematics of North American grapes (*Vitis*). He is employing field work and flavonoid chemistry in his research.

Claude dePamphilis, graduate student in botany, University of Georgia, is investigating the evolutionary biology of *Aesculus* (buckeye) in the Southeast.

Tina M. Perkins, graduate student in botany, Georgia College, Milledgeville, is working on a woody vegetative study of Rock Eagle, in Putnam County.

David Porter, professor of botany, University of Georgia, is examining herbarium specimens of *Zostera marina* and studying the wasting disease of eel-grass.

Jeffery H. Rettig, graduate student in botany, University of Georgia, is researching the *pensylvanica* group of *Carex*, the grass-like sedges, employing both flavonoid chemistry and cytological studies.

Susan L. Sherman, graduate student in botany, University of Georgia, is doing biosystematic studies of elm species (*Ulmus*) in the United States.

Brief notes on botanical research completed or underway and requests for information related to research will be considered for publication in *Tipularia*. Send to: Harriett L. Whipple, Research Report editor, Box 824, Milledgeville, Georgia 31061.

Byliners

Authors

Ann Barber and her husband, Tommy, have been informally studying pitcher plants and their pineland associates on a farm near Doerun, Georgia, for more than 20 years. They live in Moultrie.

Ruth E. Bell of Milledgeville, Georgia, is on the staff of Lockerly Arboretum, which has 47 acres, greenhouses, and a lake.

Adrienne Bond has taught creative writing and southern literature for many years at Mercer University in Macon, Georgia. She now heads the grants office at Mercer.

W. Brian Brown of Route 2, Fitzgerald, Georgia, is in the 11th grade in high school. "I spend all my spare time exploring nature," he says. Brian has had bird notes in *Oriole*, journal of the Georgia Ornithological Society.

James G. Bruce wrote his Ph.D. dissertation at the University of Michigan on club-mosses (*Lycopodium*). He taught botany at the University of Georgia and now owns a ground cover nursery in Rockville, Virginia.

Treadwell Rice Crown III, also known as Rick or Ricky, is a consulting horticulturist

with a growing interest in writing. His home is in Madison, Georgia.

Wayne R. Faircloth heads the Department of Biology at Valdosta State College. He is one of Georgia's leading authorities on flora of the Atlantic and Gulf coastal plains. He is a member of *Tipularia*'s Board of Editors.

Elaine K. Fatora of Young Harris, Georgia, has been documenting the flora of Brasstown Bald's north slope for 19 years. She is well-known for her wildflower slide shows and educational exhibits and her efforts to protect the north Georgia mountains from overdevelopment.

Harold C. Jones of Milledgeville, Georgia, a retired Georgia College professor, says he has been an enthusiastic naturalist since early childhood.

Steven M. Jones is a forest ecologist in the Department of Forestry at Clemson University. Much of his research is devoted to the management and biology of endangered species.

Andrew C. Kemp, a science instructor in the Department of Natural Science at Shorter College, Rome, Georgia, has a B.S. in biology and chemistry from Shorter and

First Person Singular

Ditch botanizing

By W. Brian Brown

Besides favorite wildflower and fern areas especially scouted for learning new species and getting to know others better, roadside ditches offer most people their best opportunity to observe regional flora. Whether it be on the way to work or to the doctor, ladies' hat-pins (*Eriocaulon*) and morning-glories (*Ipomoea*) can brighten even the dullest of trips.

Ditch botanizing is the way I'm familiarizing myself with the species of my area, around Fitzgerald, Georgia. When I see a plant I'm unsure about, I stop and investigate or I paint a picture in my head and research it later in my father's copy of Dun-

can and Foote's guide ("Wildflowers of the Southeastern United States" by Wilbur H. Duncan and Leonard E. Foote, University of Georgia Press, 1975). I'm about as far from a plant expert as one can be, but my way of flower-watching helps me greatly.

The destruction of roadsides for new highway projects is a very serious matter. To botanists, it is like the closing of a school. I became aware of this type of tragedy when a stretch of road between my hometown and Tifton, a distance of about 30 miles, was transformed into a dirt jungle.

So the next time you're looking for giant chain ferns in your favorite ditch and a passer-by gives you an empty stare, be glad you have something to stare at—and keep botanizing for the fun of it!

Editorial information The Georgia Botanical Society's goal for *Tipularia* is to combine the scientific authority of a botanical journal with the readability of a magazine. Some articles are assigned, but other manuscripts are welcome. *Tipularia* is not able to pay for articles, but there

is no charge for publication. Send all manuscripts and editorial inquiries to: Margaret Shannon, executive editor, *Tipularia*, 570 Lakeshore Drive, Duluth, Georgia 30136. A copy of "Guidelines for Authors" is available from the same address on request.



3 5185 00269 4709

is only a thesis short of an M.A. in biology from Emory University.

Marie B. Mellinger of Tiger, Georgia, is a well-known naturalist and the current president of Friends of the Mountains.

Thomas S. Patrick, botanist for the Georgia Natural Heritage Inventory, has a forestry degree from Syracuse University and a botany degree from Cornell and is a Ph.D. candidate at the University of Tennessee.

Charles V. (Chuck) Rabolli, coordinator/zoologist for the Georgia Natural Heritage Inventory, has a B.S. in forest science from Pennsylvania State University and an M.S. in forestry and wildlife biology from Clemson University. He has been with the Georgia Department of Natural Resources since 1984.

Lloyd H. Snyder Jr. of Atlanta, retired manager of Cokesbury Book Store, is a graduate of the U.S. Naval Academy and Emory University's Candler School of Theology.

Beatrice Jefferson Stubbs, who is in her 80s, lives and writes at Valley Front near Dillard, Georgia.

Miriam Talmadge of Athens, Georgia, editor of the Georgia Botanical Society Newsletter, was born in Fecamp, France, but left after eight days when her mother, wife of an American diplomat stationed in Budapest, continued her interrupted journey to London.

Harriett L. Whipple not only teaches at Georgia College in Milledgeville and edits Research Report in Tipularia, but also keeps pace with the many activities of a son and daughter.

Artists

Faith E. Birkhead and husband Bill, a faculty member at Columbus College, have recently been surveying the flora and fauna of 25 acres they own on the southwestern edge of Harris County, Georgia.

Margery Borom, an art graduate of Pratt Institute, was a package designer, art instructor, and advertising agency artist before spending 22 years as a staff artist at the Centers for Disease Control, where, among other duties, she produced countless scientific illustrations. Now retired, she lives near Lithonia, Georgia.

Mozelle Atwood Funderburk of Stone Mountain, a University of Georgia graduate, has been an illustrator and

model-maker (primarily of flora and fauna) for more than 20 years. She is married to a botanist.

Lois M. Lovejoy of Chamblee, Georgia, is a free-lance illustrator and winner of the 1982 Delaware duck stamp competition. Among her interests: wildflowers and bird-watching.

Scarlett B. Rickenbaker of Atlanta is a painter of coastal Georgia scenes, portraits, and village life in France, among other things. She also teaches art.

Cecile Smith has an M.S. in botany from the University of Georgia (1986) and is working as a free-lance illustrator in Athens, Georgia, under the banner of Camera Lucida Illustration.

Brasstown Bald

Continued from back cover

Lady fern, New York fern, broad beech fern, Goldie's wood fern, interrupted fern, Christmas fern, maidenhair fern, and hay-scented fern provide pattern and contrast. The star-like flowers of St. John's-wort call attention to the rocky cliff where lichen bids the hiker to touch its velvety surface.

Fall on the north slope of Brasstown Bald is a blaze of color overhead and underfoot. Gone are the petals of the thimbleweed bloom; only the thimble remains. The chicory is clear blue, the ironweed red-purple. The stiff gentian and the closed, or bottle, gentian are joined by the fringed gentian on the lower elevations of the Brasstown Bald-Double Knobs range.

Sometimes in late November the Bald is shrouded in fog or snow flurry. The forest seems at rest. But then I see the occasional yellow witch hazel flower or the red caps of the British soldier lichen or hear the incessant mocking of the gray squirrel or the junco that I disturb as I walk the seven-mile path back to Young Harris.

In January, like Janus, I look two ways. I reflect on the past year; I plan for the new. The calendar is clear, awaiting the four seasons of the Bald.

Directions: Brasstown Bald, altitude 4,784 feet, is the highest point in Georgia. From Dahlonega take U.S. 19 north toward Blairsville to Georgia 180; go east to Georgia 66; follow Forest Service signs to Brasstown Bald. The Visitor Center is open from 10 a.m. to 6 p.m. from May through October. A seven-mile nature trail leads from the mountaintop down the north slope to Young Harris.

Site-seeing

On the back side of Brasstown Bald

By Elaine K. Fatora

Cheered by the shining quality of the March day, I take my thermos of coffee and head for the Bald. It is spring, sharp, clear, and brilliant, yet when I reach the Bald, I realize that I have stepped back in time and in season.

The trailing arbutus has been blooming for two weeks on the bank to the west of my house, but here, at an additional 1,000 feet elevation, the buds are barely open. The galax is limp from last night's frost.

The venerable chestnut looms grotesquely toward the sky. Gone are the pungent yellow blooms and the clusters of leaves that gave this champion over the blight its graceful summer form. The barks of yellow birch, buckeye, poplar, oak, hickory, and black and choke cherry offer a study in texture, color, and form.

A week later, an occasional bloodroot, the only member of the poppy family that occurs naturally this far north in Georgia, may be spotted. Emerging from the leaf litter beneath a clump of white oaks, a hepatica blossom greets the morning. A wood anemone, or windflower, is tossed about by a sprightly gust of the east wind.

Violets—halberd-leaved yellow, round-leaved yellow, bird's-foot, primrose-leaved,

and Canada white—are beginning to make their annual appearance. Once in a while a spurred violet is to be found here.

Dutchman's breeches, columbine, and partridge berry carpet the lower edge of the boulder field, while rockcap fern, mountain spleenwort, and assorted lichens and mosses cover the surrounding rock outcrops.

Into April, as the days warm and grow longer, leaves unfold a canopy overhead. The yellow, sessile, nodding, and erect trilliums are in bloom, and the trout lily emerges. Solomon's seal, Solomon's plume, and the speckled wood lily appear among the fallen trees. Foamflower and lady rue dot the moist landscape.

A spot of yellow may be seen as a ray of sunlight pierces the canopy, the sunlight as elusive as the yellow lady's slipper orchid it beams upon. A colony of pink moccasin orchids stands like sentinels along the path and the showy orchis dots the plateau above the road. Come July, the guard will change and the rattlesnake orchid will be on duty. On the lower elevations of this north slope the fringed orchids and perhaps the spreading pogonia will make their debut in the summer.

Vasey's trillium, large, the color of mahogany, blooms well into May, and the flowering of flame azalea, mountain laurel, and rhododendron begins. It is not unusual to count more than 100 species of plants in flower on almost any day in May, June, July, and August.

False hellebore, carrion-flower, hairy bush-pea, wintergreen, bee-balm, goat's rue, ratsbane, Michaux's saxifrage, bowman's root, wild geranium, fire pink, impatiens, dogbane, Canadian ginger, blue cohosh, black cohosh, May-apple, monkshood, Turk's-cap lily, phlox, hydrangea, the great white, sessile, and whorled milkweeds, and a multitude of asters, goldenrods, and sunflowers: look and there they are.

Continued inside back cover

Cleistes divaricata, the spreading pogonia, or rosebud orchid.

Drawing by Lois Lovejoy

